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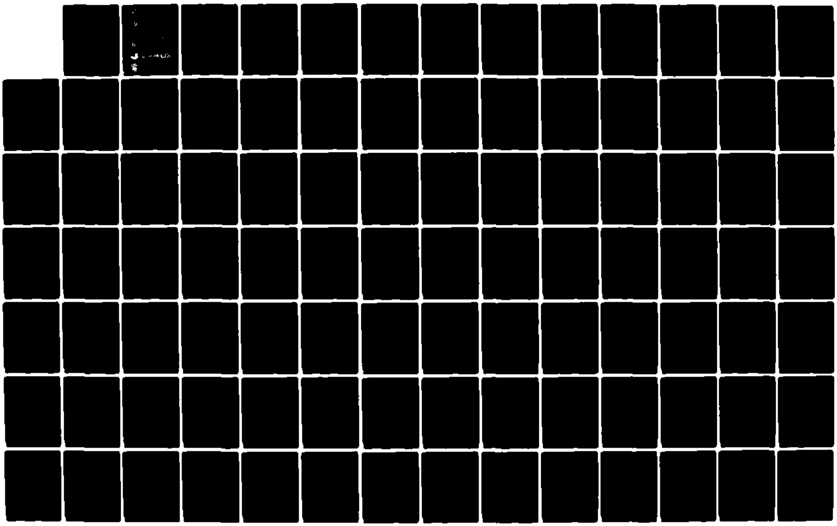

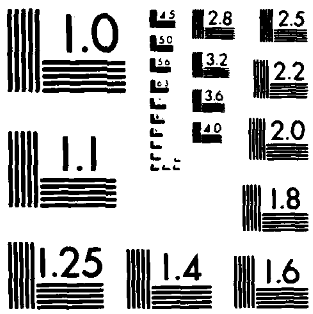

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Degradation of Jet Fuel Hydrocarbons by Aquatic Microbial Communities

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A model fuel mixture of fifteen hydrocarbons representative of those in distillate jet fuels was used to determine whether degradation by natural microbial communities could affect the persistence of such fuels released into aquatic envrionments. The mixture included hexane, cyclohexane, n-heptane, methylcyclohexane, toluene, n-octane, ethylcyclohexane, p-xylene, cumene, 1,3,5-trimethylbenzene, indan, naphthalene, 2-methylnaphthalene, n-tetradecane, and 2,3-dimethylnaphthalene. The water-soluble fraction of the model fuel was incubated in shake flasks with water or water and sediment suspensions collected

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at estuarine and freshwater sites. Surface films of the model mixture were studied under quiescent incubation.

The disappearance of hydrocarbons was measured by capillary gas chromatography. Control flasks were sterilized with HgCl to estimate losses due to abiotic processes. C_6-C_9 compounds volatilized quickly. Indan, naphthalene, and 2-methylnaphthalene were much less volatile and were biodegraded from solution after an initial 24-hour lag period. The presence of sediment-associated microflora stimulated degradation. Biodegradation was not an important fate process of the model fuel components in the quiescent test. Assays of total heterotrophs and hydrocarbonoclastic bacteria indicated an initial toxicity of the fuel mixture followed by a stimulation of hydrocarbon-degrading bacteria.

Fate tests were repeated with petroleum-derived JP-4. The soluble components of JP-4 were volatilized too rapidly for biodegradation to occur. Sedimentation dramatically affected the fate of fuel components when mixing of the hydrocarbon and sediment layers was studied. Sediment-associated components were more resistant to volatilization and microbial attack. Substituted benzenes and n-alkanes were readily biodegraded when not limited by evaporation and sedimentation. JP-4 did not prove toxic to the microbial communities of the test systems, but did stimulate the replication of hydrocarbonoclastic bacteria.

PREFACE

This research was done as a part of an ongoing investigation of the biodegradation of Air Force jet fuels. The testing was conducted at the United States Environmental Protection Agency Environmental Research Laboratory (USEPA ERLGB), Gulf Breeze, Florida, under Interagency Agreement No. AR-57-F-2-A-016 for the Air Force Engineering and Services Center, Engineering and Services Laboratory (AFESC/RD) Tyndall AFB FL and under cooperative agreement R B09370-01 between Georgia State University, Atlanta, and USEPA ERLGB. Work was performed under JON 19002034.

This report covers work performed between October 1981 and October 1983. The The AFESC/RDVC project officer was Mr. Thomas B. Stauffer.

This report discusses the microbial degradation of hydrocarbon mixtures in aquatic systems and the probable results of jet fuel leakage or spillage under various environmental circumstances. References to specific equipment or brand names should not be construed as endorsements of, or advertisements for, those products.

This report has been reviewed by the Public Affairs Office (PA) and is releaseable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nationals.

This technical report has been reviewed and is approved for publication.

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SECTION I

INTRODUCTION

In recent decades the transport of crude and refined products between and within industrialized nations has increased with consumer demand, as has the incidence of hydrocarbon pollution. The sinking of the tanker, TORREY CANYON, in 1967 is regarded as the incident which most stimulated scientific interest in the fate and effects of spilled petroleum (Reference 1). Since that time, numerous studies have examined the fate of crude oils in the marine environment, but relatively little information is available to predict the biodegradation rates of the light hydrocarbons found in refined products such as automotive, marine, and aviation fuels. Such fuels are transported in great quantities, and their accidental release into the aquatic environment is a common occurence. The fate of these individual hydrocarbons, which is determined by their solubility, volatility, sorption to sediment, and biodegradation, must be assessed to predict the potential impact of spills. The solubility and volatility (Reference 2), and sorption (Reference 3), of such hydrocarbons have recently been studied. We have undertaken a study to assess the impact of biodegradation on the fate of the hydrocarbons in aquatic systems. The goal of the study is to determine quantitative biodegradation rates for the hydrocarbons that remain in the aquatic systems long enough to be subject to microbial attack. Such rates will be used in mathematical models, along with information on sorption and volatility,to predict the fate of hydrocarbon fuels released into the environment.

SECTION II

BACKGROUND

Distillate fuels are complex mixtures of aliphatic and aromatic hydrocarbons. The aliphatic fraction can be further subdivided into the *n*-alkanes, branched alkanes, and cycloalkanes. Of the major components of JP-4 (those representing 0.1 percent or greater by weight), 32 percent are *n*-alkanes, 31 percent are branched alkanes, and 16 percent are cycloalkanes (Reference 2). The *n*-alkanes of intermediate chain length are readily biodegradable; they are usually catabolized by a monoterminal oxidation to a carboxylic acid followed by β-oxidation (Reference 1). The acetyl-coenzyme A produced during β-oxidation is further metabolized to CO_2 via the tricarboxylic acid cycle, or used in carbohydrate synthesis via the glyoxylate cycle. Branched alkanes are more resistant to microbial attack due to the blockage of β-oxidation by the branch groups. Cycloalkanes are highly resistant to biodegradation and are catabolized chiefly by means of co-oxidation (Reference 4); thus, they do not support growth of the degrading organisms, but are oxidized during growth of the organisms on another, usually similar, substrate. Initial attack on the molecule involves an oxygenation and subsequent ring cleavage to form simple, readily degradable acids (Reference 5).

Aromatic hydrocarbons account for 21 percent of the major components of JP-4 (Reference 2). Degradation of aromatic ring structures is initiated by hydroxylation of the ring. The presence of two hydroxyl groups in either *ortho* or *para* configuration is required for ring opening (Reference 6). Ring opening is then accomplished by dioxygenase enzymes and the further degradation of the resultant compounds is relatively simple. Light aromatic hydrocarbons are relatively biodegradable under aerobic conditions. Resistance to degradation

increases with increased substitution and also with increases in the number of rings in polycyclic compounds (Reference 7).

Much of the information available on degradation pathways and rates has been obtained from work with single compounds and pure microbial cultures. Recently, various investigators have examined the degradation of specific compounds within a hydrocarbon mixture by mixed microbial populations (References 8, 9, 10). Degradation rates varied widely, depending on what hydrocarbons were present, and to what extent the microbial community had been previously exposed to hydrocarbon compounds.

Two processes that can cause degradation rates to vary in complex mixtures of hydrocarbons are co-oxidation and sparing. Co-oxidation, mentioned briefly above, is a process by which otherwise recalcitrant compounds are transformed during microbial growth at the expense of similar compounds within the mixture. Jamison et al. (Reference 11) hypothesized that co-oxidation could account for differences in biodegradation rates observed in studies of individual hydrocarbons, and the same compounds within a high-octane gasoline. The role of co-oxidation in natural systems is largely unknown; however, it probably is an important factor in determining the fate of hydrocarbon mixtures released into the environment.

Sparing has also been noted during the degradation of petroleum mixtures (References 12, 13). In some instances, the presence of one or more compounds causes a reduction in the rate of removal of another compound. Sparing may simply indicate a preferential attack on one carbon source and the repression of enzymes necessary for the degradation of an alternate carbon source. Whatever the mechanism, it is apparent that sparing might significantly affect the composition of hydrocarbon mixtures in nature.

Although the majority of information regarding microbial attack on hydrocarbon mixtures has been obtained from laboratory studies, some information is available from *in situ* studies concerning the fate of petroleum distillates in the environment. Gasoline degradation was studied by Jamison et al. (Reference 11) after an accidental spill near Ambler, PA. Contaminated groundwater was supplemented with organic nutrients and oxygen. The results indicated that the major components of gasoline were readily biodegradable, although in several instances only by means of co-oxidation. Similar results were obtained by Roubal et al. (Reference 14) in a study of gasoline degradation in the Ohio River. They reported that gasoline was no longer detectable in contaminated river sediments 48 hours after a 300,000-liter spill. They found that the indigenous microbial community rapidly assimilated petroleum hydrocarbons. The community seemed to have been "adapted" due to frequent previous contamination of the river with hydrocarbons. Dibble and Bartha (Reference 15) found that kerosene was similarly susceptible to biodegradation in soil, but that there were significant seasonal differences in rates.

In contrast to the above studies, Mayo et al.(Reference 16) reported that JP-4 and diesel fuel were degraded very slowly in cold, anoxic sediments after a spill near Searsport, Maine. Similarly, Horowitz and Atlas (Reference 17) found that gasoline degradation proceeded very slowly in an arctic lake. Results in these studies and others (References 18, 19, 20) indicate that biodegradation of hydrocarbons depends to a great extent on temperature and oxygenation. While significant microbial attack can occur at temperatures as low as 5°C, the presence of oxygen is absolutely required for biodegradation of hydrocarbons at an appreciable rate. The effects of inorganic nutrient availability, while less well defined, are of considerable importance

(Reference 1). Thus, nitrogen and phosphorous concentrations in natural waters can be expected to limit hydrocarbon degradation after a major spill.

Biodegradation rates for organic compounds are measured in the laboratory by using mixed-culture systems obtained from the environment. The ultimate goal of such studies is to use the measured rates in mathmatical models to predict the fate of the compound in the environment. Paris et al. (Reference 21) showed that for certain readily hydrolyzable compounds the rate of degradation in laboratory test systems was proportional to the total bacterial biomass in the system, regardless of the source of the inoculum. Therefore, they were able to derive a second-order rate equation to predict biodegradation rates based on total biomass.

Unfortunately, biodegradation rates do not seem to be proportional to total biomass when the catabolism of the test compound requires specific reactions. Populations taken from different environments can exhibit wide variations in their ability to attack organic compounds. Spain et al. (Reference 22) found that certain aromatic compounds disappeared as much as three orders of magnitude faster in populations previously exposed to the compounds. The degradation rate was related to the number of specific organisms in the population able to degrade the test compound and not to the size of the total heterotrophic populations.

Walker and Colwell (Reference 23) noted a two orders-of-magnitude-difference in the number of hydrocarbon degraders in microbial communities taken from polluted versus unpolluted sites. The fraction of hydrocarbon degraders in a microbial community is related to the exposure history of the site. Exposure of communities to hydrocarbons in the environment or in the laboratory often leads to dramatic increases in the populations able to attack hydrocarbons. Populations thus adapted can be expected to show considerably

higher catabolic activity with hydrocarbons. Such was the case, for example, in the above mentioned study of gasoline degradation in the Ohio River (Reference 14). An unusually high fraction of the indigenous community in the polluted environment was able to degrade the constituents of gasoline. The high proportion of hydrocarbon degraders correlated with an unusually high rate of gasoline degradation after the spill, and in laboratory systems inoculated with microbial populations taken from the river.

It is apparent from the studies mentioned above that the biodegradation rates of hydrocarbon compounds are dependent upon a number of factors. The most important of those factors may be the nature of the microbiota, particularly with regard to previous exposure to hydrocarbons, and the fraction of the microbial community with the ability to degrade the hydrocarbons in question. Other factors include temperature, oxygen tension, nutrient concentrations, type of hydrocarbon mixture, configuration and substitution of the individual compounds, interactions between the hydrocarbons and sediments, and salinity. Before laboratory-derived degradation rates can be extrapolated to the environment, each of these factors must be considered.

SECTION III

MATERIALS AND METHODS

A. SAMPLING SITES

Water and sediment samples were collected at three sites near Pensacola, Florida; Bayou Chico, Escambia River, and Range Point Salt Marsh (Figure 1). The locations were selected to provide a range of salinities as well as a comparison between pristine and developed areas. Bayou Chico is located on the northern shore of Pensacola Bay in an industrial area, salinity ranges from 12 to 20 parts per thousand ($^{o}/oo$), and there is a regular hydrocarbon input from nearby industry and marinas. The Escambia River site is 8 miles upstream from the mouth of the Escambia River, above local industry. Salinity is zero and the surrounding area is largely undeveloped. Range Point salt marsh is located on the north side of Santa Rosa Island, approximately 3 miles east of the Bob Sikes Bridge. Salinity varies from 10 $^{o}/oo$ to 20 $^{o}/oo$ and the area is nearly pristine.

Water was collected, transported to the laboratory, filtered through a 3.0-micron membrane filter (Nuclepore Co.), and stirred overnight at room temperature. The top 3 to 5 cm of sediment and associated detritus were collected at each site along with the overlying water. The suspension was passed through a 2-mm screen, and particles of sand were allowed to settle. The resultant organic sediment slurry was decanted and then stirred overnight at room temperature.

B. FATE SCREEN

Two experimental systems were used to assess the fate of hydrocarbon mixtures. The first was a shake-flask system to study the biodegradation of hydrocarbons in a well-mixed, aerobic situation. Fuels in surface films and undisturbed sediment layers were studied in a quiescent system. The source of

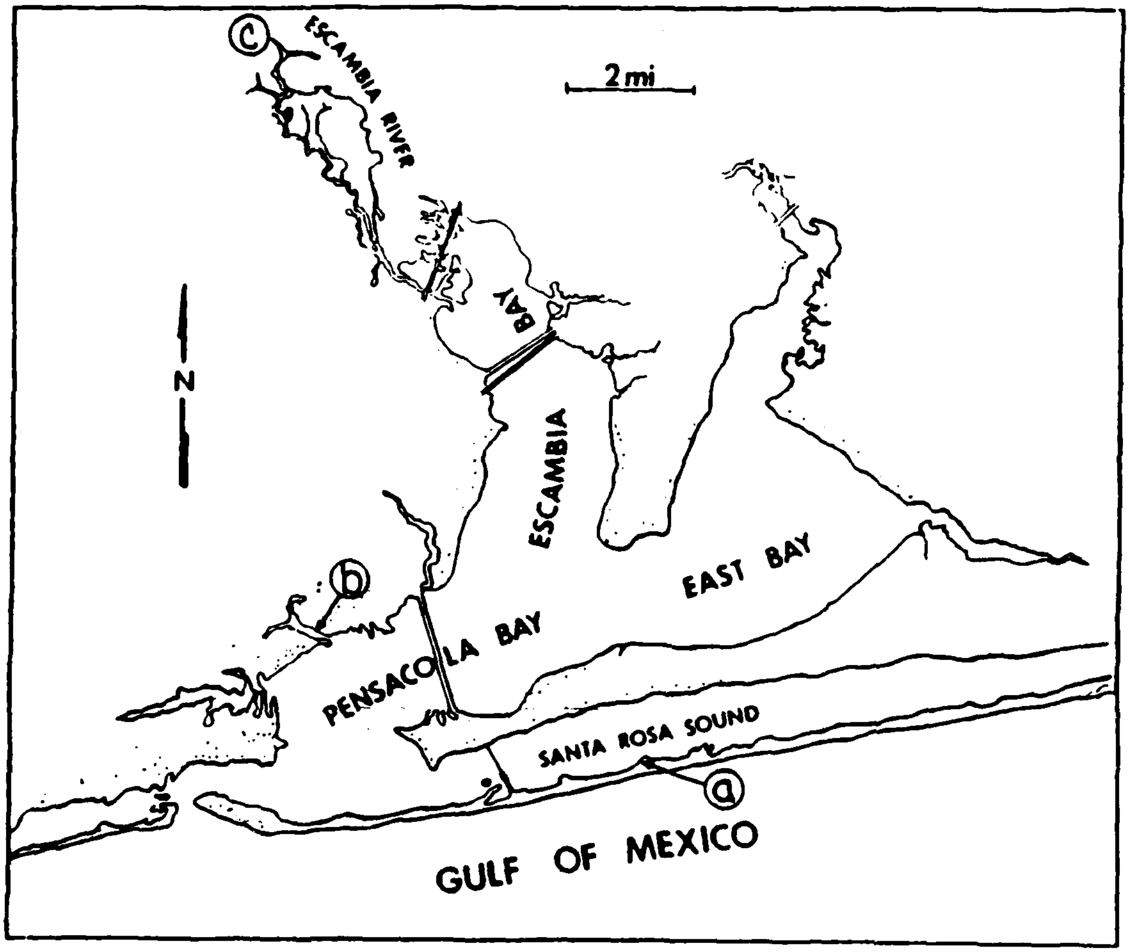


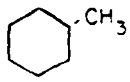
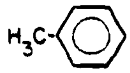
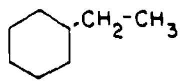
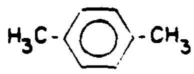
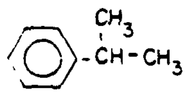
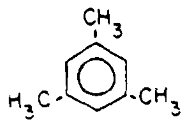
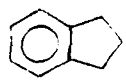
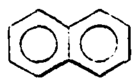
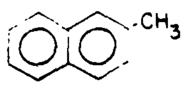
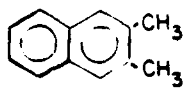
Figure 1. Water and Sediment Sampling Locations. (a) Range Point Salt Marsh, (b) Bayou Chico, (c) Escambia River.

hydrocarbons for the shaken test was a standard water-soluble fraction (WSF) of the fuel being tested. The WSF was prepared by mixing 4 liters of filtered water and the appropriate amount of fuel in a glass bottle for 6 hours with a Teflon®-coated stir bar and magnetic stir plate. The speed of mixing was adjusted such that no trailing droplets from the hydrocarbon layer were formed. The bottle was tightly capped during mixing and headspace was limited to a maximum of 2 cm. The mixture was allowed to settle for 1 hour, and the WSF was removed from the bottom of the bottle through a glass siphon tube. The fuel-to-water ratio (f:w) used in preparing the WSF for tests with the model fuel was 1:200 v/v; for JP-4 tests the f:w was 1:50.

The model fuel was an equal-weight mixture of 15 compounds representing the boiling range and hydrocarbon classes of petroleum-derived JP-4 (Table 1). JP-4 was used as received from Wright-Patterson Air Force Base, Ohio.

Each fate screen consisted of six test flasks: (1) Active water (AW) contained WSF only; (2) Sterile Water (SW) contained WSF, sterilized by the addition of 0.1 percent $HgCl_2$; (3) Active Sediment (AS) contained WSF and sediment (500 mg/ℓ dry weight); (4) Sterile Sediment (SS) contained WSF, sediment, and 0.1 percent $HgCl_2$; (5) Control Water (CW) contained filtered water from the test site with no additions; (6) Control Sediment (CS) contained filtered water and 500 mg of sediment/ℓ. All shaken tests were done in 1-liter, straight-sided, glass bottles. The inital volume in each bottle was 500 ml. Shaken flasks were incubated on a rotary shaker (Lab-Line Instruments) at 23°C and 75 rpm for the duration of the test. At each sampling interval the flasks were removed from the shaker, stirred on a magnetic stir plate at a speed just sufficient to create a homogeneous sediment suspension, and 25 ml samples were removed. Samples were extracted with 1.0 ml of CS_2 that

Table 1. MODEL FUEL HYDROCARBONS

n-HEXANE	$CH_3(CH_2)_4CH_3$
CYCLOHEXANE	
n-HEPTANE	$CH_3(CH_2)_5CH_3$
METHYLCYCLOHEXANE	
TOLUENE	
n-OCTANE	$CH_3(CH_2)_6CH_3$
ETHYLCYCLOHEXANE	
p-XYLENE	
CUMENE	
1,3,5-TRIMETHYLBENZENE	
INDAN	
NAPHTHALENE	
2-METHYLNAPHTHALENE	
n-TETRADECANE	$CH_3(CH_2)_{12}CH_3$
2,3-DIMETHYLNAPHTHALENE	

contained 0.1 percent v/v hexadecane as an internal standard. Samples of the CS_2 were then removed, placed in glass vials, sealed with silicone septa, and held at -4°C until analysis.

The pH and salinity of the sediment and water samples were measured prior to each fate test. The pH was measured again at the initial and final sampling times.

Quiescent fate tests consisted of sets of four test flasks: (1) Active Water (AW) contained filtered water from the sampling site; (2) Sterile Water (SW) contained filtered water sterilized with 0.1 percent $HgCl_2$; (3) Active sediment (AS) contained sediment (5000 mg/ℓ dry weight) and filtered water; (4) Sterile sediment (SS) contained sediment, 0.1 percent $HgCl_2$, and filtered water from the test site. Quiescent tests were done in 150 ml milk dilution bottles, and one set of bottles was prepared for each sample time. The final volume of liquid in each bottle was 25 ml. The hydrocarbon mixture (250 μℓ) was added to the surface of the water in each bottle with a microliter syringe, and the bottles were capped and shaken in a horizontal position for 10 minutes at 100 rpm to encourage initial sediment-fuel interaction. The caps were then removed and the bottles incubated horizontally and undisturbed. An additional set of active and control bottles, used to monitor microbial populations, was prepared in the same manner. No hydrocarbons were added to the control bottles. After incubation for appropriate intervals the total contents of each bottle were extracted with 10 ml of CS_2, that contained hexadecane as an internal standard. Duplicate 1 ml samples of the extracts were placed in glass vials, sealed with silicone septa, and stored at -4°C until analyzed. Sampling times for both the quiescent and the shaken fate tests were 0, 2, 4, 8, 24, 48, 72, 120, and 168 hours.

Preliminary quiescent experiments to determine the fate of hydrocarbons layered on the surface of the water were conducted in the same manner except

that the final sediment concentration was 500 mg/ℓ and there was no initial mixing.

C. CHEMICAL ANALYSIS

Fate-screen samples were analyzed by high-resolution capillary gas chromatography on a Hewlett Packard 5730A gas chromatograph equipped with a capillary inlet, autosampler, and cryogenic unit. The instrument was interfaced to an HP 3357 computer for analysis of raw data. The model fuel mixture was analyzed with a 25-meter, 0.2 mm i.d. fused-silica capillary column (HP WCOT No. 19091-60025) with methyl silicone fluid phase. Oven temperature was programmed with a linear temperature gradient from 40 to 220°C (16°C/min), with isothermal operation at 40°C for 4 minutes and at 220°C for 8 minutes. The carrier gas was nitrogen. Flow rates for the analyis were: split vent, 32.9 ml/min; septum vent, 4.3 ml/min; column flow, 0.4 ml/min at 10 psi; makeup gas, 32.2 ml/min. Compounds were detected by flame ionization. Shaken-model fuel samples were injected in the splitless mode. Quiescent tests with the model fuel mixture were analyzed in the split mode because of higher fuel concentrations. Both the shaken and quiescent model fuel tests were analyzed with detector and inlet temperature of 250°C, and hexadecane as an internal standard.

A 25-meter small-bore 0.2 mm i.d. fused silica capillary column (Scientific Glass Engineering BP-1) with methyl silicone-bonded phase was used for the analysis of JP-4. All JP-4 samples were injected in the splitless mode and quantitated by comparison with a hexadecane internal standard. The temperature gradient was linear from 30°C to 220°C (8°c/min) with isothermal operation at 30°C for 8 minutes and at 220°C for 4 minutes. The carrier gas was helium. All other chromatographic conditions were the same as those used for the model fuel analysis.

The inital concentration of each fuel component in either the model fuel or JP-4 quiescent test was calculated, using fuel density and the component weight percent as follows:

$$[(0.01)\ V_s\, \delta\, p]/V_t = C_i$$

Where:

C_i = initial concentration in mg/ℓ

V_s = volume of fuel added in μl,

δ = fuel density in mg/μl,

p = weight percent of the compound of interest (Table 2),

V_t = total volume of the mixture in liters.

The comparison of the calculated value with the initial analytical value for each compound was used to estimate recovery efficiency.

The efficiency of recovery from the shaken test systems could not be calculated because V_s, δ, and p vary as the fuel partitions from the surface layer into the water column. An estimate of the recovery values for the model compounds was made by spiking six replicate 25 ml samples of raw estuarine water with 3 μl of the model fuel. The samples were extracted with 1.0 ml of CS_2 and analyzed. The calculated concentration for each compound was then compared to the analytical result (Table 3). Data obtained during fate tests were not corrected for extraction efficiency.

Analytical values were corrected for contaminated environmental samples by subtracting the area of interfering peaks in control samples from the appropriate peaks of test samples. The corrected concentrations were recorded in data files by compound and flask type. Statistical analyses of the data were performed, using standard programs for means and standard deviations and simple linear regression.

The means and standard deviation program generated both a means table and a mean plot. For each compound at each sample time the means table includes

Table 2. WEIGHT PERCENT OF COMPOUNDS IN TEST FUEL MIXTURES

Compound	JP-4	Model Fuel
n-Hexane	2.21	6.67
Benzene	0.50[a]	0
Cyclohexane	1.24[a]	6.67
n-Heptane	3.67	6.67
Methylcyclohexane	2.27	6.67
Toluene	1.33[a]	6.67
n-Octane	3.80	6.67
Ethylbenzene	0.37[a]	0
Ethylcyclohexane	--[b]	6.67
p-Xylene	0.35[a]	6.67
Isopropylbenzene	0.30	6.67
1-methyl-3-ethylbenzene	0.49[a]	0
1,3,5-Trimethylbenzene	0.42	6.67
1,2,4-Trimethylbenzene	1.01[a]	0
n-Decane	2.16[a]	0
Indan	--[b]	6.67
1,4-Dimethyl-2-ethylbenzene	0.70[a]	0
n-Undecane	2.32[a]	0
Naphthalene	0.50[a]	6.67
n-Dodecane	2.00[a]	0
2-Methylnaphthalene	0.56[a]	6.67
n-Tridecane	1.52[a]	0
2,3-Dimethylnaphthalene	--[b]	6.67
n-Tetradecane	0.73[a]	6.67

[a]Monitored during JP-4 tests (Reference 2, p. 34-35).
[b]Less than 0.10 percent by weight.

Table 3. RECOVERY OF THE MODEL COMPOUNDS FROM ESTUARINE WATER.

Compound	Actual Concentration (μg/ml)	Amount Recovered (μg/ml)	% Recovery	± sd
n-Hexane	8.29	4.20 ± 0.43	50.7	±5.2
Cyclohexane	8.29	5.44 ± 0.43	65.6	±5.2
n-Heptane	8.29	6.51 ± 0.32	78.5	±3.9
Methylcyclohexane	8.29	6.62 ± 0.36	79.8	±4.3
Toluene	8.29	6.76 ± 0.39	81.5	±4.7
n-Octane	8.29	6.81 ± 0.26	82.2	±3.1
Ethylcyclohexane	8.29	6.86 ± 0.22	82.7	±2.7
p-Xylene	8.29	6.96 ± 0.29	84.0	±3.5
Cumene	8.29	7.44 ± 0.29	89.8	±3.5
1,3,5-Trimethylbenzene	8.29	8.15 ± 0.25	98.3	±3.0
Indan	8.29	7.68 ± 0.27	92.6	±3.3
Naphthalene	8.29	7.88 ± 0.25	95.0	±3.0
2-Methylnaphthalene	8.29	8.25 ± 0.27	99.5	±3.3
n-Tetradecane	8.29	8.49 ± 0.34	102.4	±4.1
2,3-Dimethylnaphthalene	8.29	8.31 ± 0.32	100.2	±3.8

the concentration of each injection, the mean concentration, the standard deviation, and the minimum and maximum concentrations. The mean was then plotted against time on a log normal scale. Each graph depicts the concentration of one compound in four flasks.

Regression analyses were performed on the log transformation of the concentration data. Rates were assumed to be linear for regression analyses even though the actual rate of disappearance of the compounds often varied over the test period. Values for r^2 give some indication of how well the data are explained by a linear model.

D. TOTAL ORGANIC CARBON MEASUREMENT

Total organic carbon (TOC) was measured with an Oceanographic International TOC Analyzer System. Appropriately diluted water or sediment samples (5 ml) were treated with 1.0 ml of saturated potassium persulfate and 0.2 ml of phosphoric acid (10 percent). The samples were purged with oxygen to exclude CO_2, sealed, and autoclaved to complete the oxidation of organic carbon to CO_2. The CO_2 concentration was then measured with an infrared analyzer. A standard curve was prepared with potassium biphthalate as the organic carbon source. Blanks were prepared with distilled water as a check for carbon in the reagents.

E. MICROBIOLOGY

Heterotrophic bacteria were enumerated by a standard five-tube most probable number (MPN) technique (Reference 14). The enumeration medium contained 1 g of yeast extract and 5 g Bacto-Peptone (DIFCO) per liter. The PH was adjusted to 7.6 prior to autoclaving. Salinity values were matched to those at each sampling site with an aged sea salts solution. Each MPN tube was inoculated with 1.0 ml of an appropriate dilution of an environmental sample. Tubes were incubated at room temperature and examined for turbidity after 2 weeks.

Hydrocarbonoclastic bacteria were enumerated by a five-tube ^{14}C-MPN technique similar to that described by Lehmicke et al. (Reference 25). The enumeration medium was a minimal salts broth (MSB), adjusted to pH 7.6 and to the proper salinity with NaCl (Table 4). One ml aliquots of the basal medium were dispensed into 4 ml vials (Omnivials, Wheaton Scientific). The vials were capped, sterilized by autoclaving, and stored at 5°C until used. The substrate was n-[1-^{14}C]-hexadecane (Amersham) with a specific activity of 235 μCi per mg. The hexadecane was diluted in hexane to a concentration of 8.25 μg/ml and 5.0 μℓ were transferred aseptically to sterile Sensi Discs (BBL) in a sterile petri dish. The hexane carrier was allowed to evaporate for 10 minutes, and the discs were then distributed into the separate vials of MSB. The Sensi Discs sank to the bottom of the vials, thus minimizing the volatilization of hexadecane from the medium. The substrate remained associated with the disc where it was available for degradation. This procedure resulted in a substrate concentration of 41 μg/ℓ and 20,000 dpm per vial. Each vial was inoculated with 0.1 ml of the appropriate dilution of a sample, and was incubated without a cap inside a tightly capped glass scintillation vial which contained 1 ml of 1 N NaOH (Figure 2). After incubation for 2 weeks the Omnivials were removed, Carbon-14 cocktail (R.J. Harvey Instrument Co.) was added to the NaOH, and radioactivity was measured by liquid scintillation counting in a Beckman 8100 liquid scintillation counter. Any vial that exceeded the background average by 1 percent or more of the total available counts was scored as positive.

Table 4. CONSTITUENTS OF THE MINIMAL SALTS BROTH (MSB) USED FOR THE ENUMERATION OF HYDROCARBONOCLASTIC BACTERIA.

Salt	Concentration ($\mu g/ml$)
$MgSO_4.7H_2O$	112.5
$ZnSO_4.7H_2O$	5.0
$NaMoO_4.2H_2O$	25.0
KH_2PO_4	136.0
Na_2HPO_4	140.0
$CaCl_2$	14.0
$FeCl_3$	0.1
NH_4Cl	1.0
NaCl	a

[a]Adjusted to match salinity of sampling site.

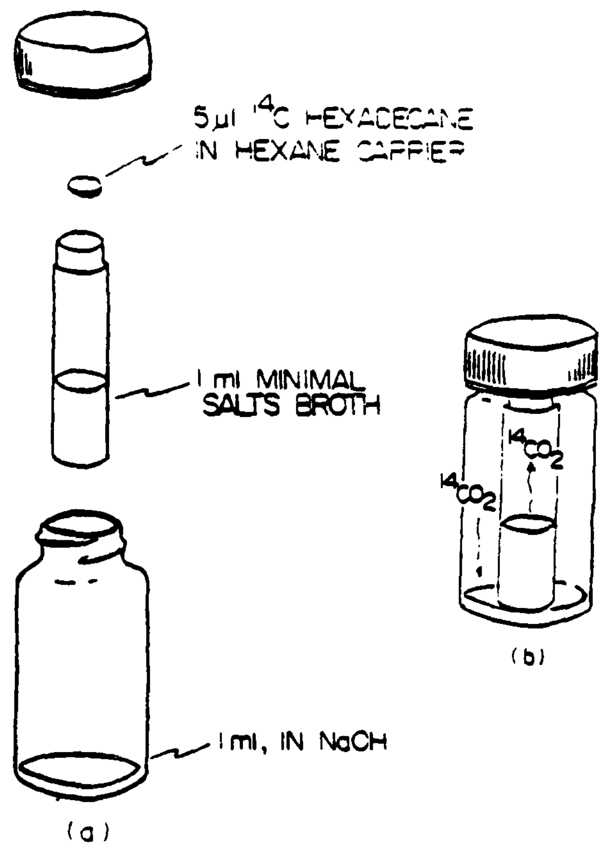


Figure 2. Enumeration of Hydrocarbon Degrading Micro-organisms (a) Replicate Vials Received ^{14}C-Hexadecane Sorbed onto Sterile Filter Discs, and 0.1 ml of Diluted Sample. (b) Cultures were Incubated in Capped Scintillation Vials Containing 1 ml of 1 N NaOH for 2 Weeks.

SECTION V

RESULTS

A. HYDROCARBON FATE

1. Model Fuel

Thirteen of the 15 compounds in the model fuel mixture were found in the water-soluble fraction; n-octane and n-tetradecane were not sufficiently soluble to be detected. The rates of loss of the remaining compounds from both the biotic and abiotic flasks indicated that evaporation was the only important fate process for the C_6 to C_9 compounds other than indan. Hexane, for example, volatilized so rapidly that it was generally not detectable after the initial sampling time. Indan, naphthalene, 2-methylnaphthalene, and 2,3-dimethylnaphthalene did not evaporate as readily. Fate tests indicated that naphthalene, and 2-methylnaphthalene were biodegraded in both freshwater and brackish water systems after an initial lag period of approximately 24 hours. Indan was similarly degraded in brackish water. The degradation of the model fuel was most evident in flasks containing water and sediment. There was no indication of any biodegradation of 2,3-dimethylnaphthalene during the test period.

The fate test from the Bayou Chico site exemplifies the behavior of the model fuel in a shaken test. Cyclohexane and methylcyclohexane evaporated rapidly from solution and were nondetectable after 4 hours (Figures 3-4). n-Heptane and ethylcyclohexane were not detected after the initial sample. Toluene, p-xylene, cumene, and 1,3,5 trimethylbenzene (mesitylene) remained in solution longer, but did not show any evidence of biodegradation or sedimentation (Figure 5-8). Indan, naphthalene, and 2-methylnaphthalene were biodegraded in the sediment flask after an initial 24-hour lag period (Figure 9-11). Naphthalene was also degraded in the active water flask.

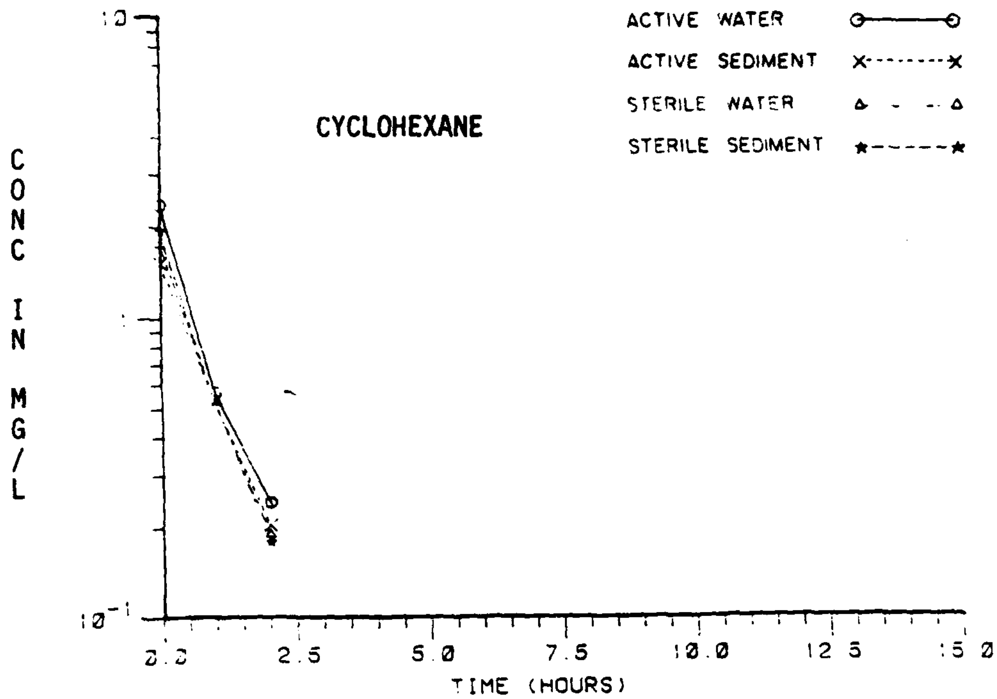


Figure 3. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

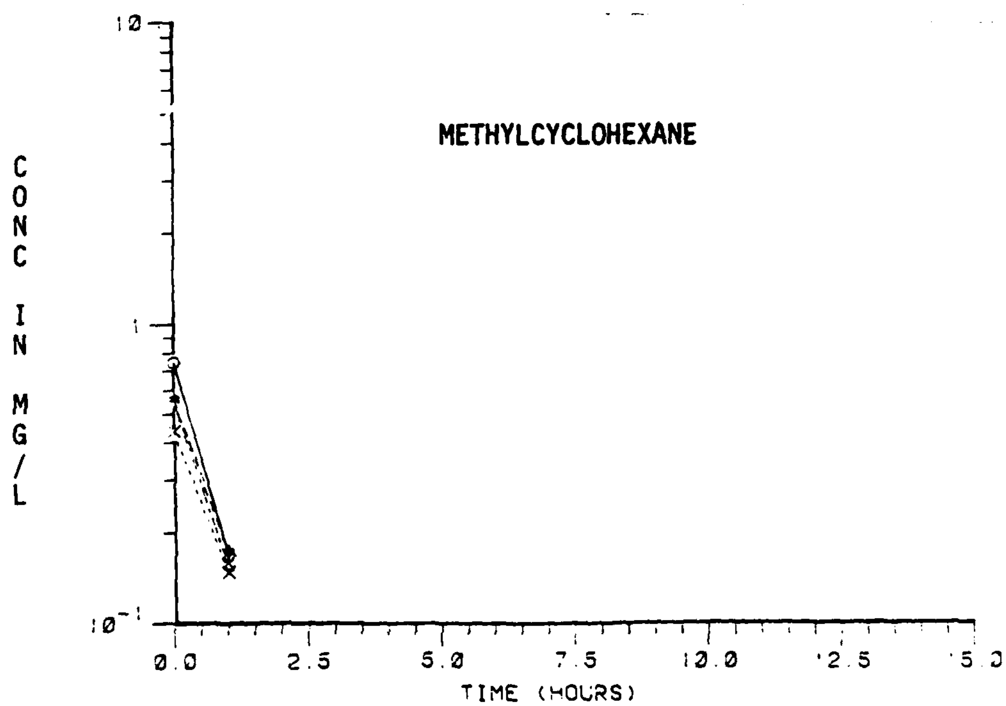


Figure 4. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

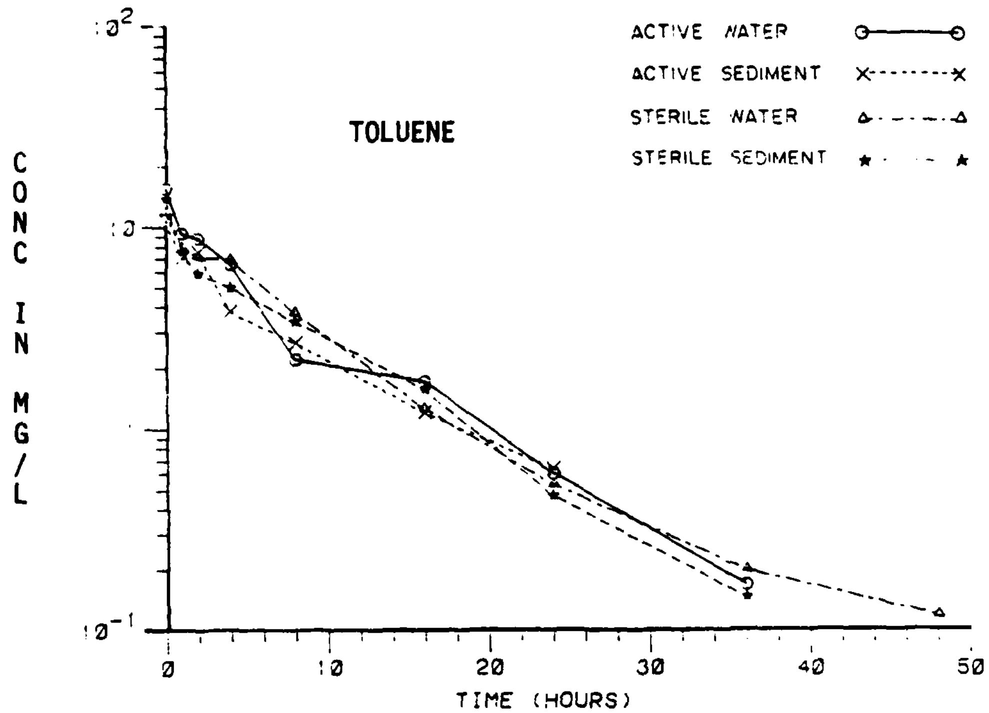


Figure 5. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

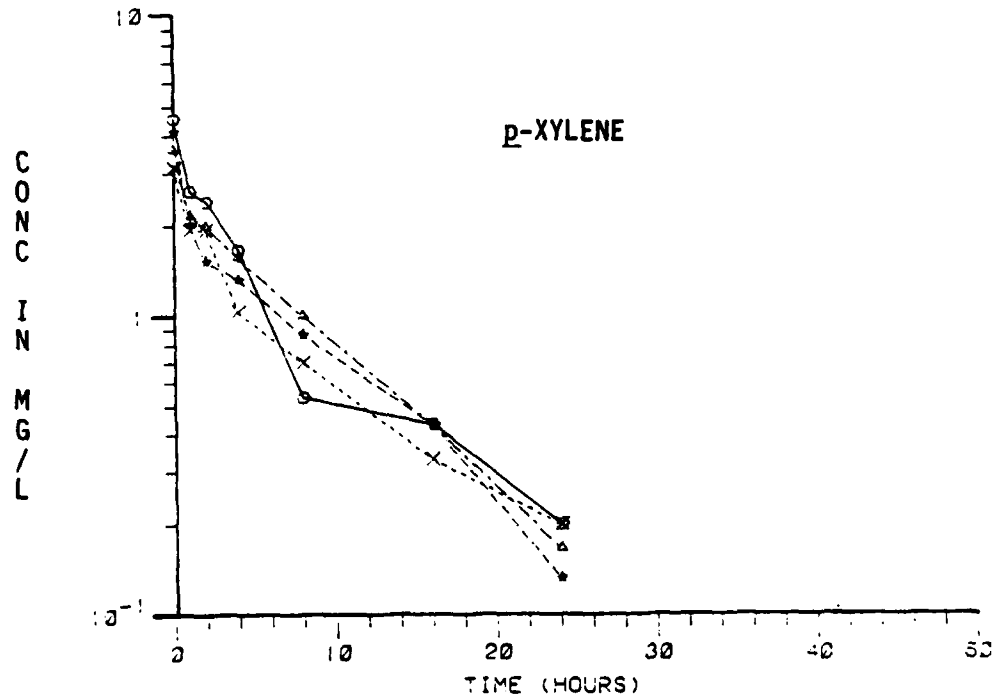


Figure 6. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

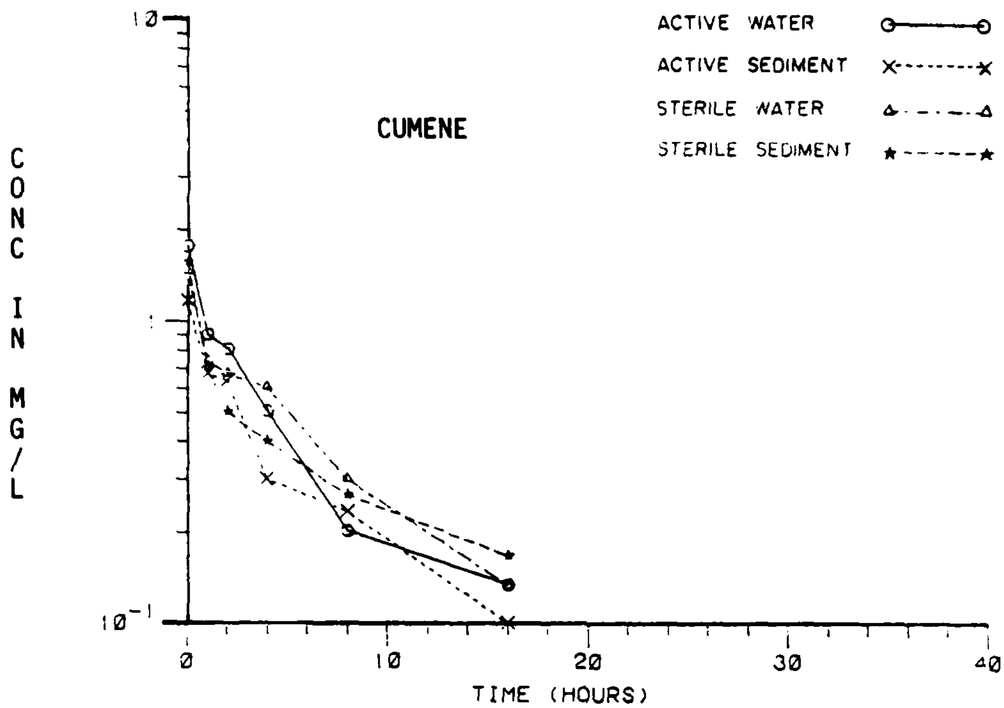


Figure 7. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

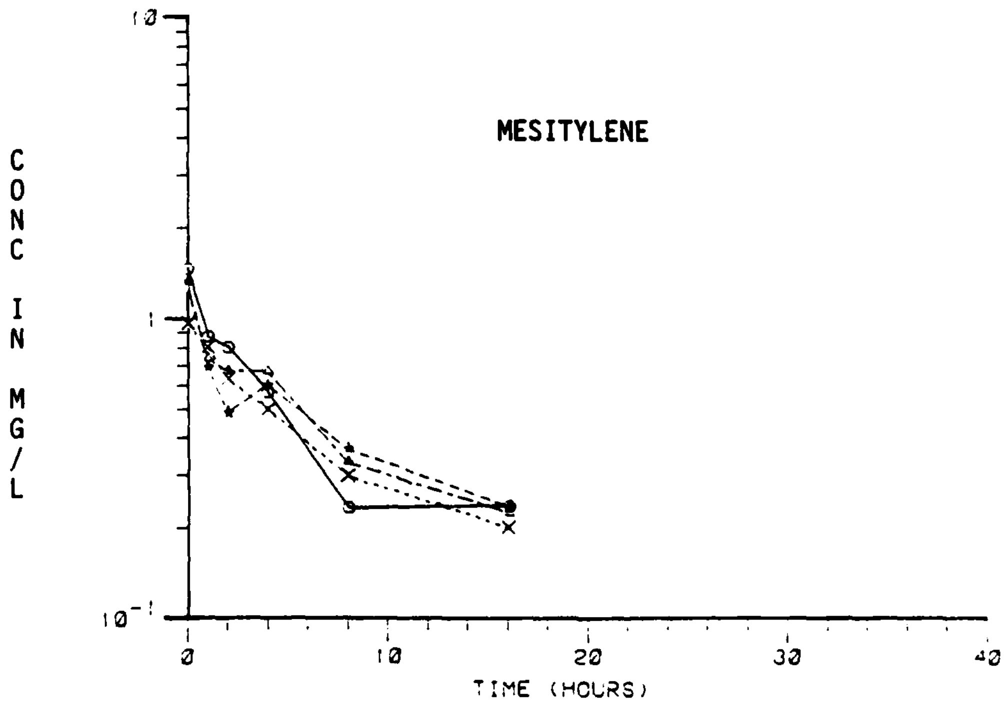


Figure 8. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

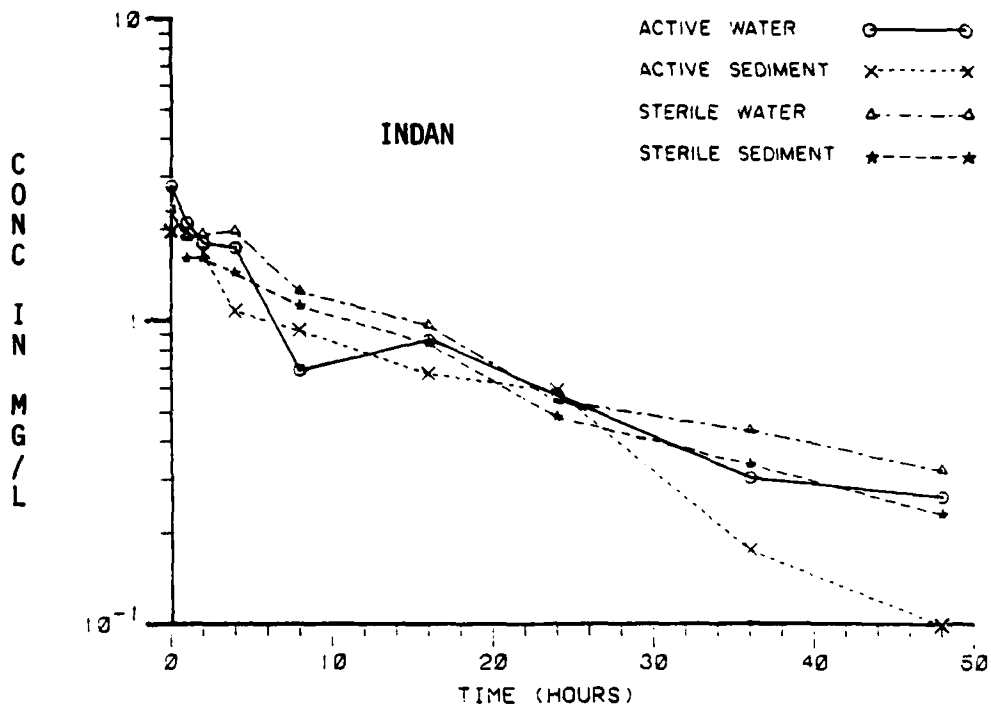


Figure 9. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

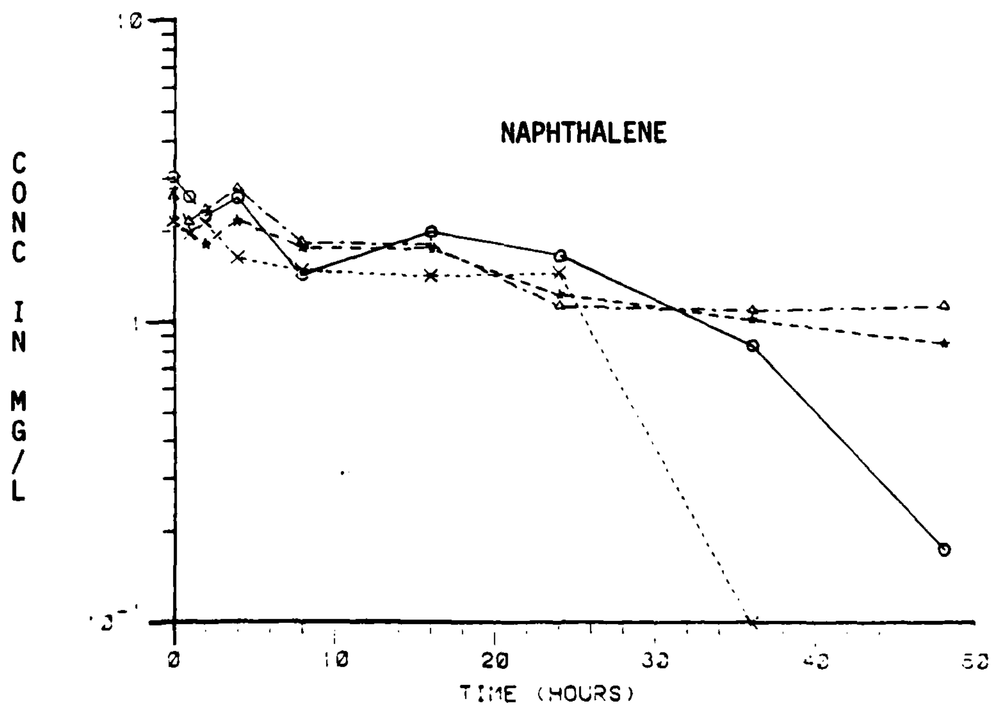


Figure 10. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

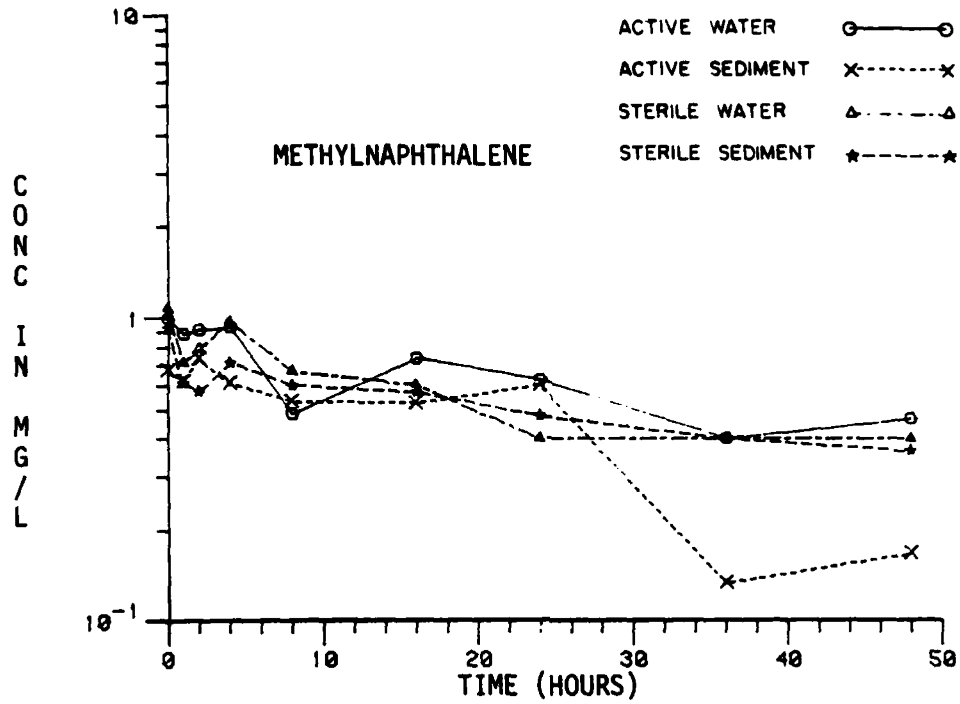


Figure 11. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

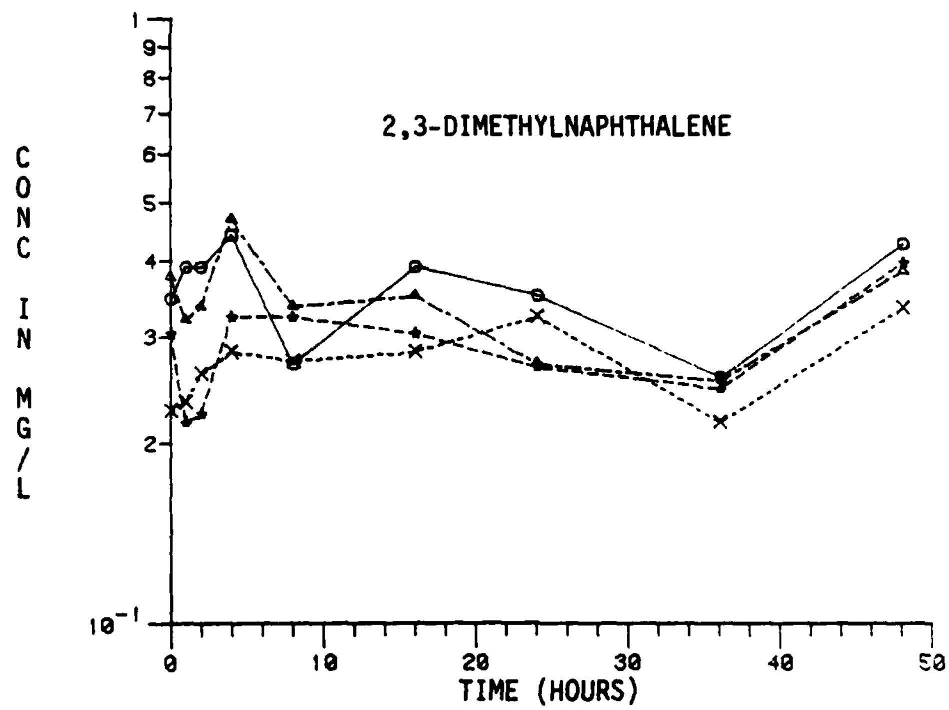


Figure 12. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

Dimethylnaphthalene persisted throughout the test period and was not biodegraded (Figure 12). The results of the remaining shaken tests with the model fuel are shown in Appendices A and E.

The onset of biodegradation was marked by a noticeable acceleration in the disappearance of the compounds from the active flasks. The slope values listed in Appendices E and F include all the data points available for a compound, and thus reflect both biotic and abiotic processes. Although they may serve as a basis for a comparison of rates, they do not accurately represent biodegradation rates. Instances where rates increased due to biodegradation are characterized by low r^2 values, indicating a poor fit of the data to a first-order model.

In preliminary quiescent experiments the model fuel was layered gently on the surface of the water. An example of such a test is illustrated in Appendix B-1. Since this test did not involve a WSF of the model fuel, all 15 of the model compounds are represented. There were no rate differences between active and sterile, or water and sediment flasks for any of the compounds. Evaporation was the sole rate-determining process and was influenced only by the vapor pressure of the compounds.

Fuels accidentally released into the aquatic environment in the past have persisted only in situations where interaction with the sediment has taken place (References 16, 26). Therefore, the quiescent test was modified to encourage phase interaction,as would be expected in areas of turbulence in the aquatic environment. The modified test provided information about the partitioning of the hydrocarbons into the sediment and the degradability of sorbed hydrocarbons.

The first test of this type with the model fuel was conducted with sediment and water from the Bayou Chico site. There was a high background

level of hexane or a similar compound that made detection of hexane difficult, but all of the other hydrocarbons were monitored over the 7-day test period. Cyclohexane, toluene, p-xylene, cumene, mesitylene, and indan all showed substantially lower rates of evaporation from flasks with sediment indicating an effect due to sedimentation (Figures 13-18). n-Heptane, n-octane, ethylcyclohexane, naphthalene, 2-methylnaphthalene, n-tetradecane, and 2,3-dimethylnaphthalene disappeared at similar rates in both sediment and water flasks (Figures 19-25). The extraction efficiency of the hydrocarbons, particularly those with higher molecular weight, was low in flasks containing sediments. Volatility was the major fate process for all of the compounds. Sedimentation also clearly affected the weathering process by removing a portion of each compound from the surface layer. Toluene was affected the least by sedimentation; it evaporated rapidly, compared to the other model compounds. Only naphthalene showed any evidence of biodegradation. The rate of disappearance of the parent compound increased during the experiment and exceeded that in sterile controls, which suggests microbial attack. Methylcyclohexane and cumene disappeared most rapidly from sterile water flasks.

When the quiescent test was repeated with water and sediment from the Escambia River, n-heptane and methylcyclohexane evaporated much more slowly from flasks that contained sediment than from water flasks. The fate of the remaining compounds was similar to that in the above test. The extraction efficiency for flasks that contained sediment was better than in the Bayou Chico test even though the sediment concentration was higher in the Escambia River test. The higher TOC concentrations of Bayou Chico sediment (Table 5) probably enhanced partitioning into the sediment layer. The Escambia River samples also differed from the Bayou Chico samples in that the extraction

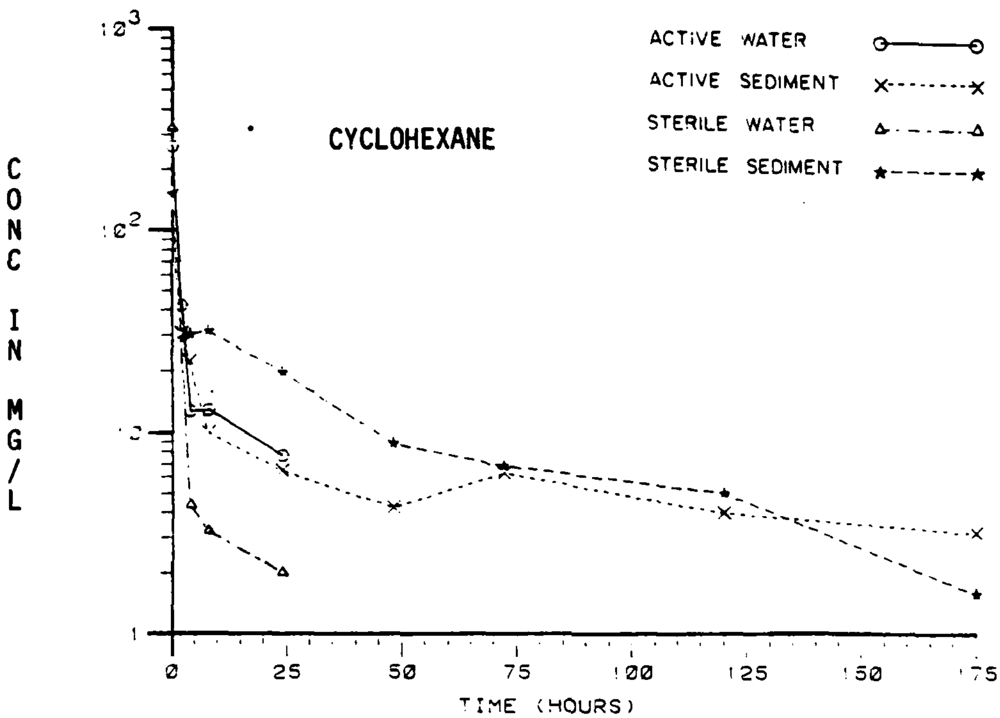


Figure 13. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

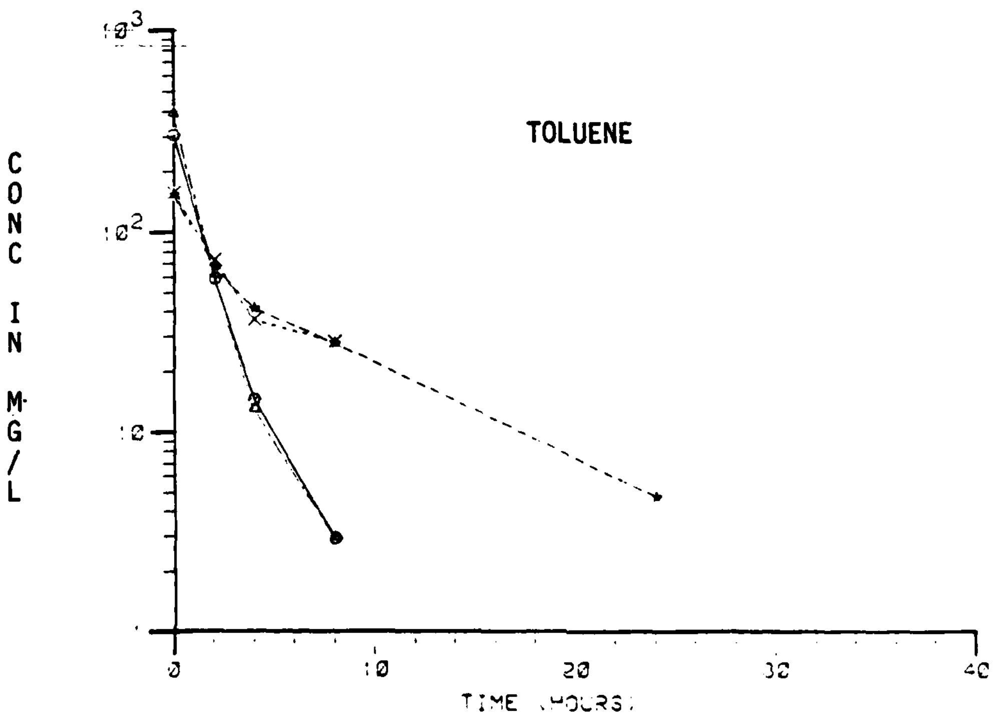


Figure 14. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

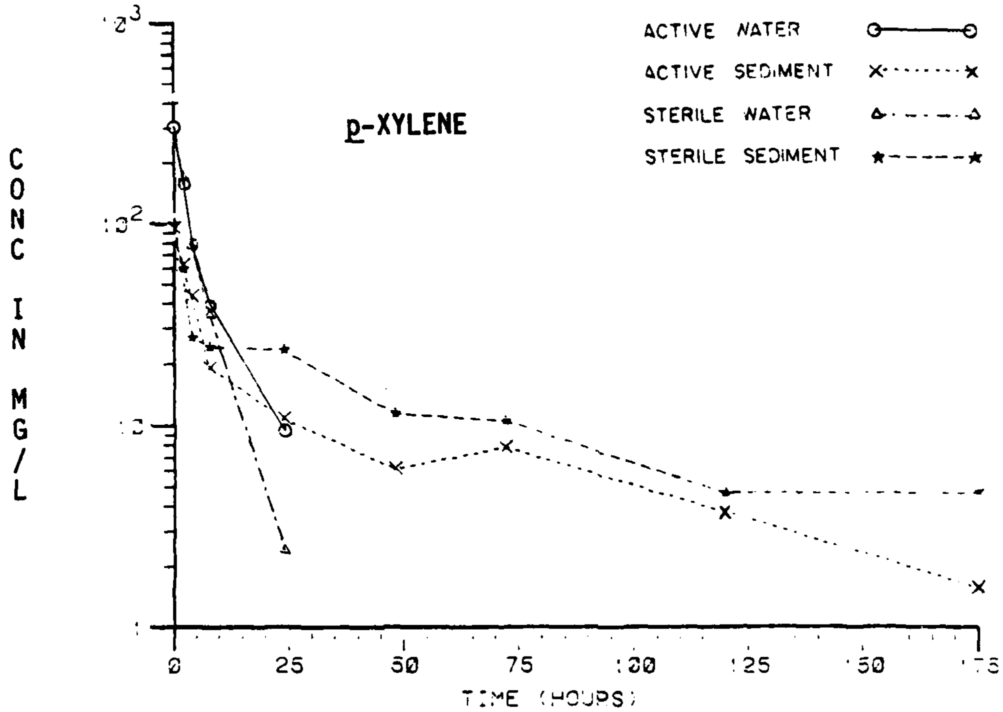


Figure 15. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

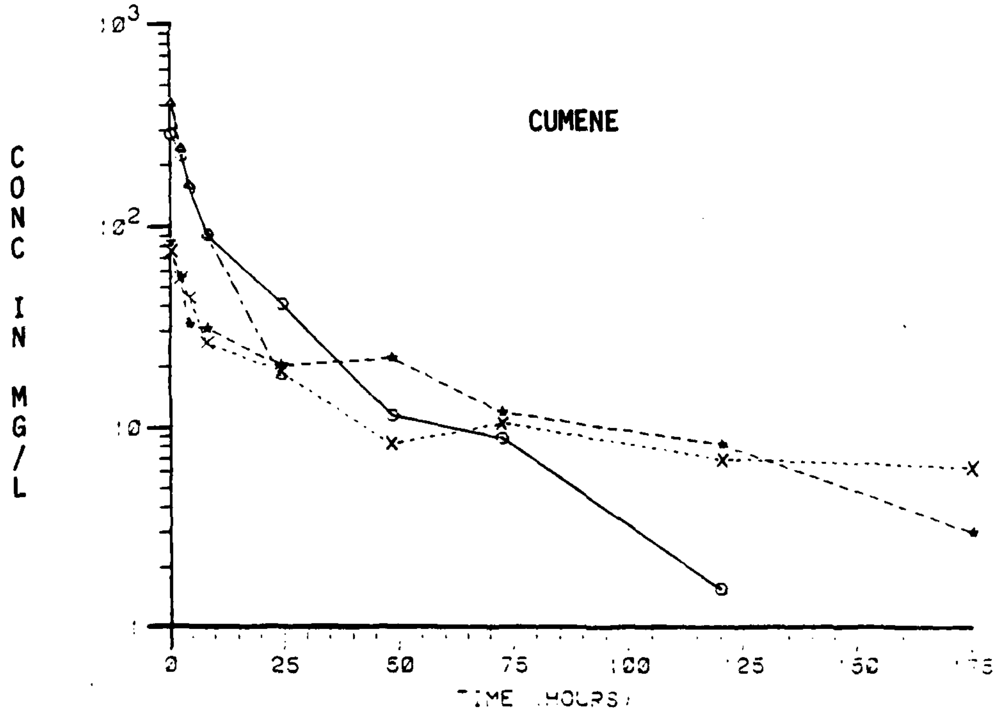


Figure 16. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

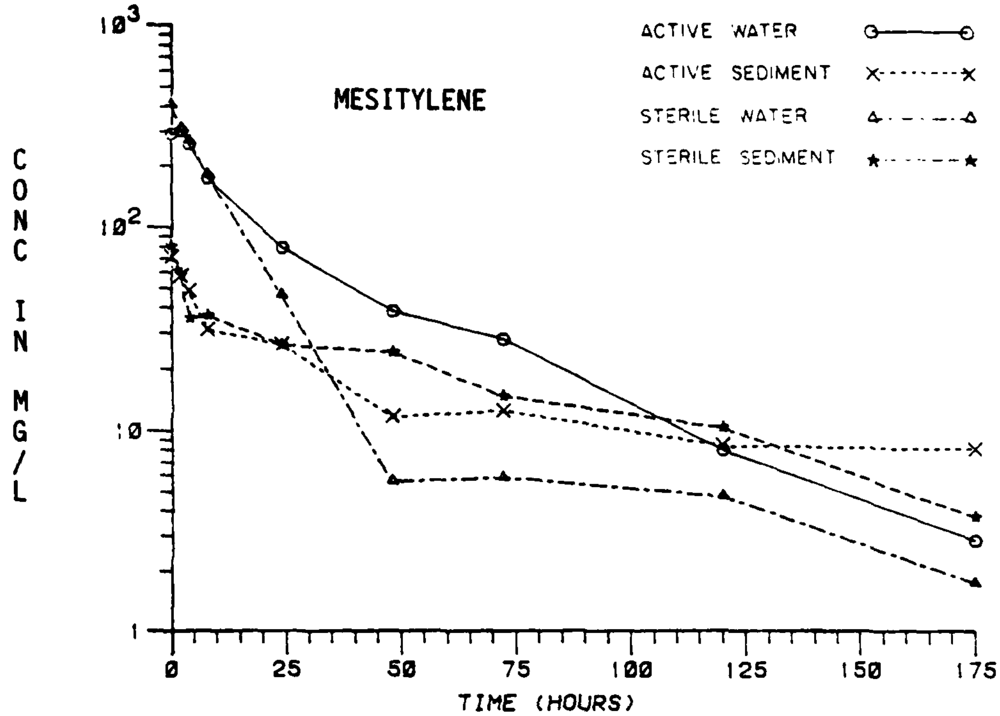


Figure 17. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

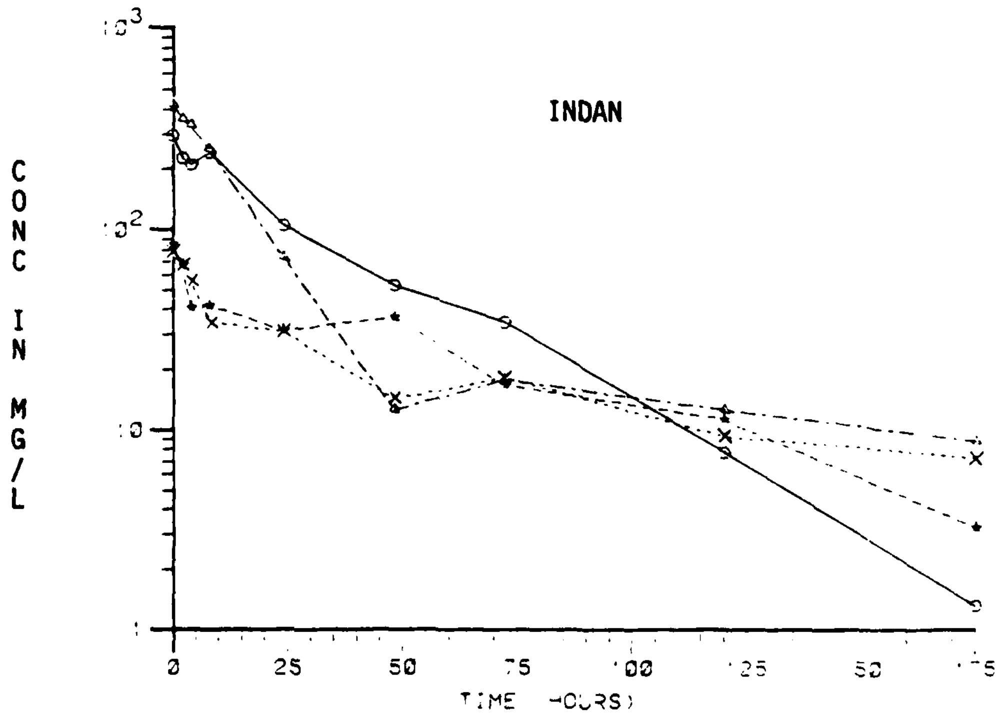


Figure 18. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

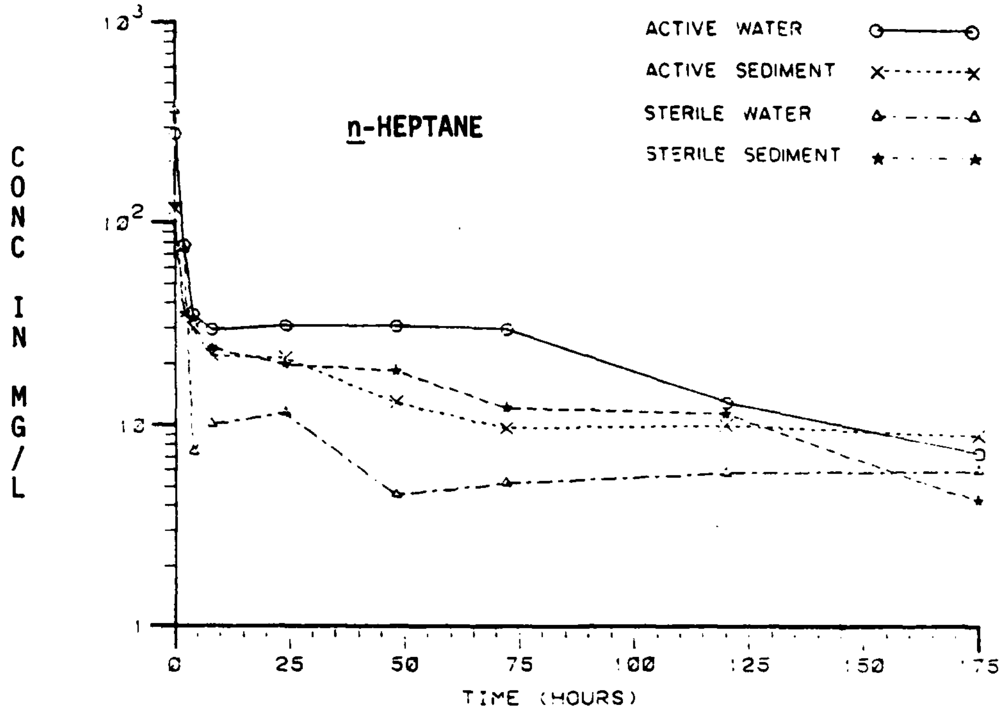


Figure 19. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

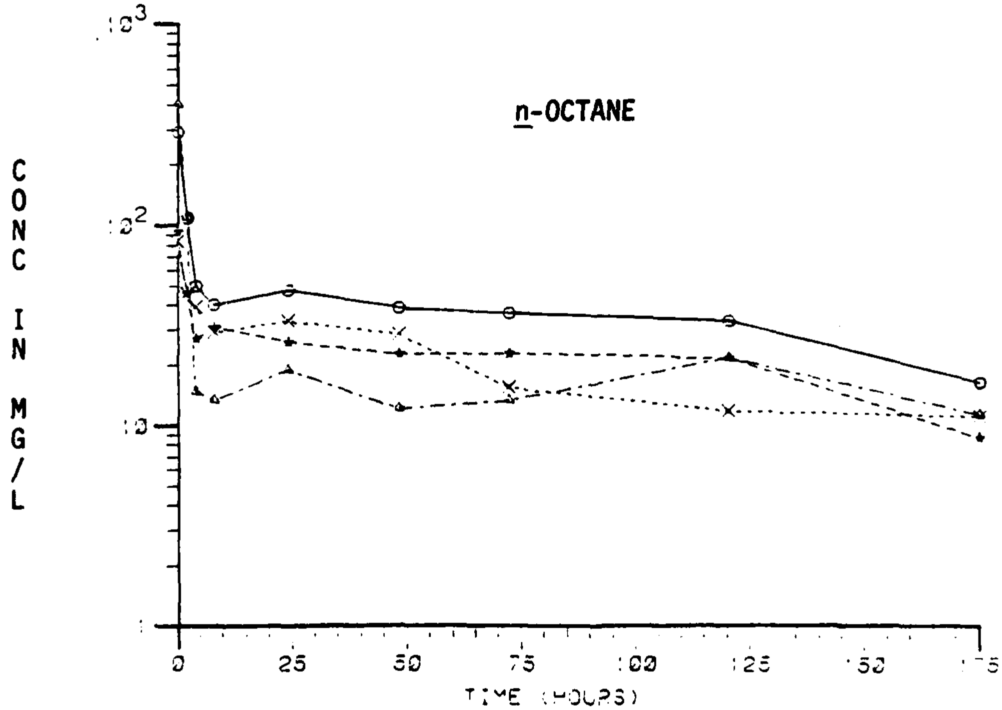


Figure 20. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

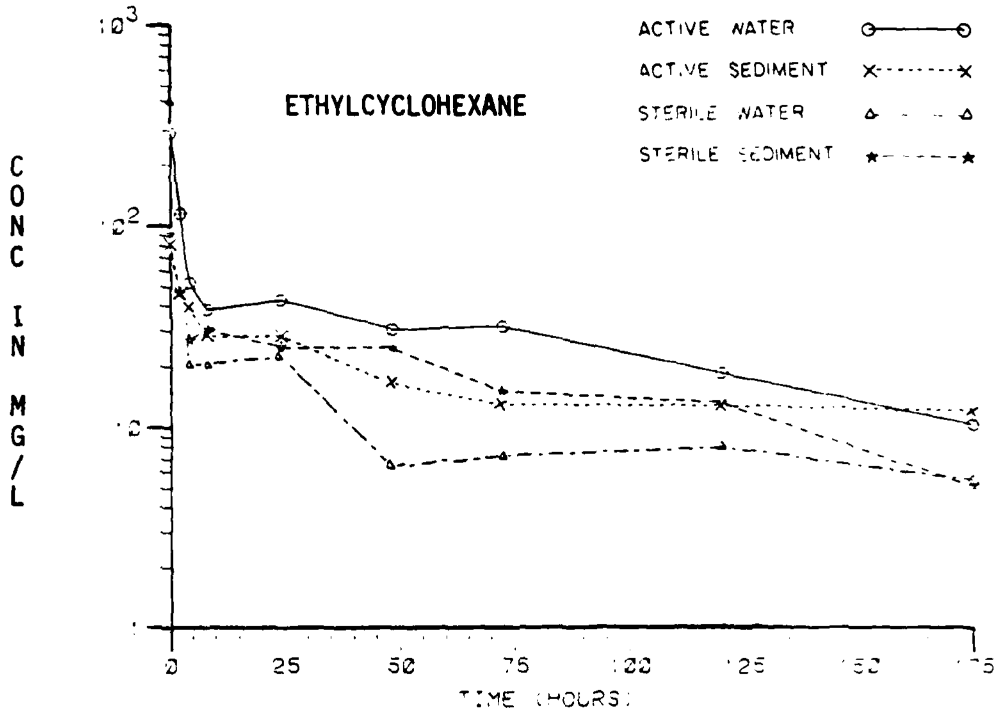


Figure 21. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

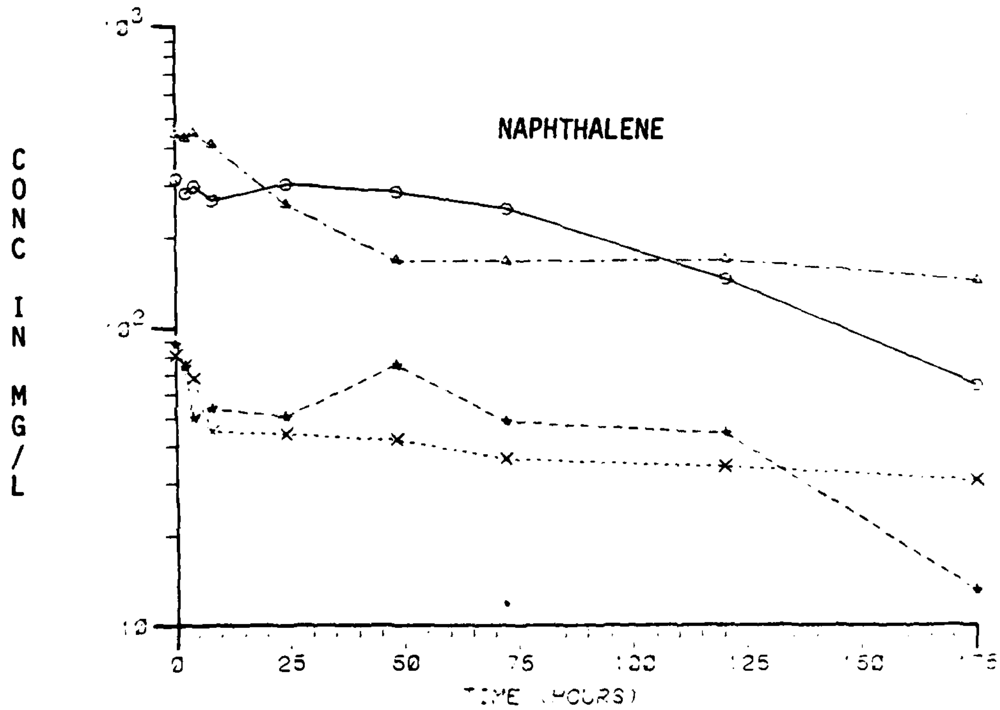


Figure 22. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

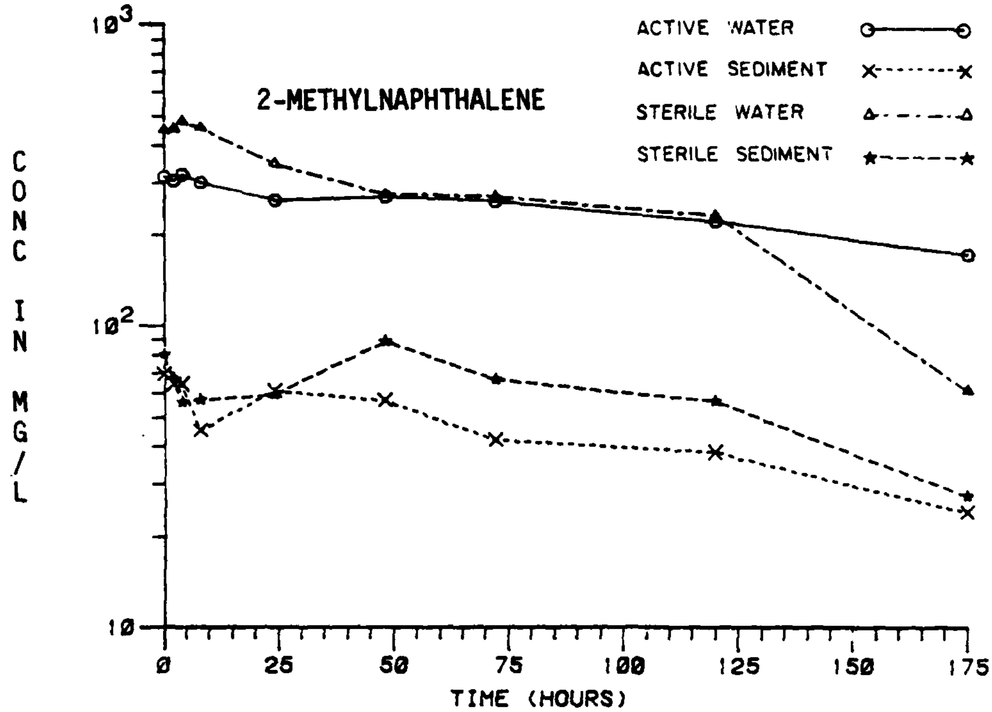


Figure 23. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

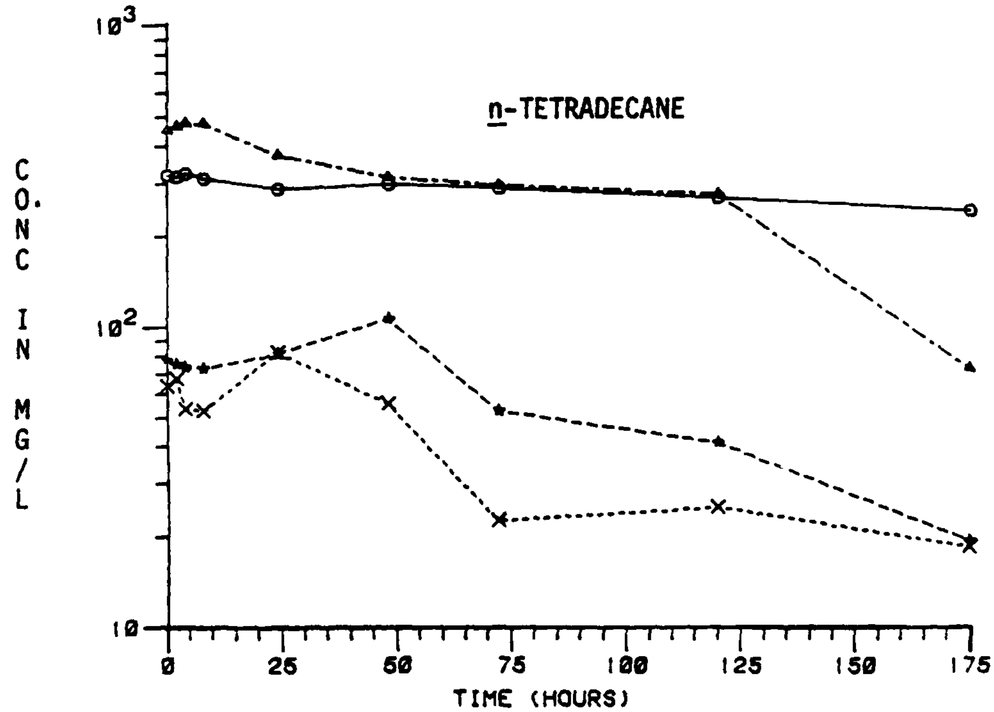


Figure 24. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

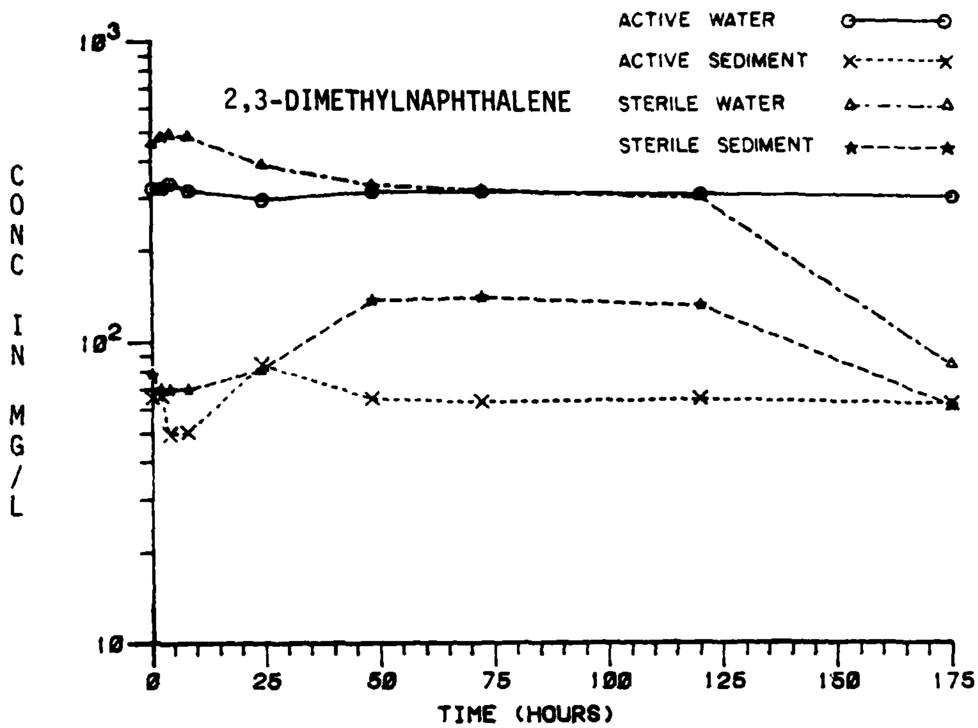


Figure 25. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel.

Table 5. TOTAL ORGANIC CARBON (TOC) CONCENTRATIONS IN WATER AND SEDIMENT SAMPLES.

	TOC (mg/ℓ) water[a]	TOC (mg/ℓ) sediment[b]	Date
Range Point	8.6	99.7	1-18-82
	29.0	90.0	7-4-82
	42.0	114.0	7-28-82
Bayou Chico	42.0	75.0	6-8-82
	38.3	61.0	6-10-82
Escambia River	10.0	26.0	5-19-82
	9.8	27.4	5-21-82
	9.1	29.7	6-30-82
	7.3	29.5	7-7-82

[a]TOC measured on water samples filtered through a 3.0 micron membrane filter.

[b]TOC measured on sediment water suspensions uniformly prepared with 500 mg sediment (dry weight) per liter.

efficiency was decreased in active sediment, but not in sterile sediment, and hexane, cyclohexane, methylcyclohexane, toluene, xylene, ethylcyclohexane, and cumene were lost faster in sterile than in active systems (see Appendix B). Mercury salts in control flasks may have reacted with inorganic particulates to decrease the sorption of the hydrocarbon compounds. This would occur in both sediment and water flasks because there were suspended particulates (less than 3 microns) in the water flasks. Alternatively, sterilization may have inhibited a biologically mediated sorption process. There was no indication of biodegradation of any of the compounds in this test.

2. JP-4

The WSF of JP-4 contains a number of compounds, including: benzene, cyclohexane, toluene, ethylbenzene, xylenes, 1-methyl-3-ethylbenzene, 1,2,4-trimethylbenzene, n-decane, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene (Reference 2). Many of these compounds, however, are present in concentrations too low to be monitored over the period of the biodegradation test. Only three of the compounds--benzene, toluene, and xylene--were present in the WSF in sufficient quantities to be studied.

The first JP-4-shaken fate test was performed with water and sediment from the Escambia River site. In this test there was no evidence of biodegradation of any of the compounds, and the presence of sediment did not affect the rates of disappearance. Benzene evaporated from all flasks at similar rates and was last detected in the 24-hour sample (Figure 26). Toluene disappeared slightly faster from flasks that contained sediment than from water flasks (Figure 27). There were no significant differences between rates in active and sterile flasks. Xylene evaporated from all flasks at a similar rate and was not detected after the 24-hour sample (Figure 28).

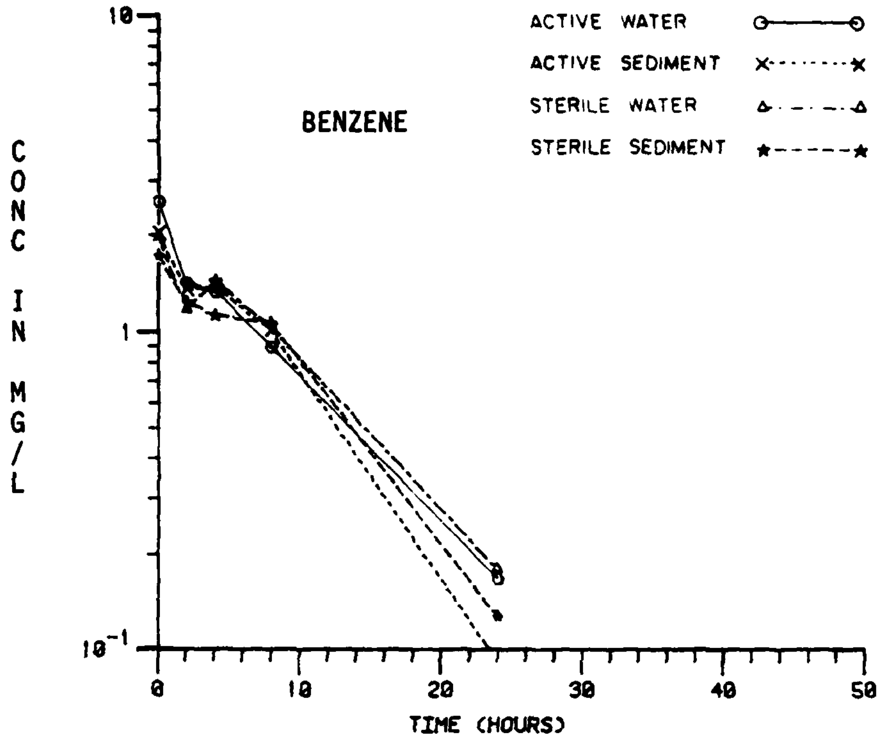


Figure 26. 6-30-82 Escambia River Shaken Fate Screen, JP-4.

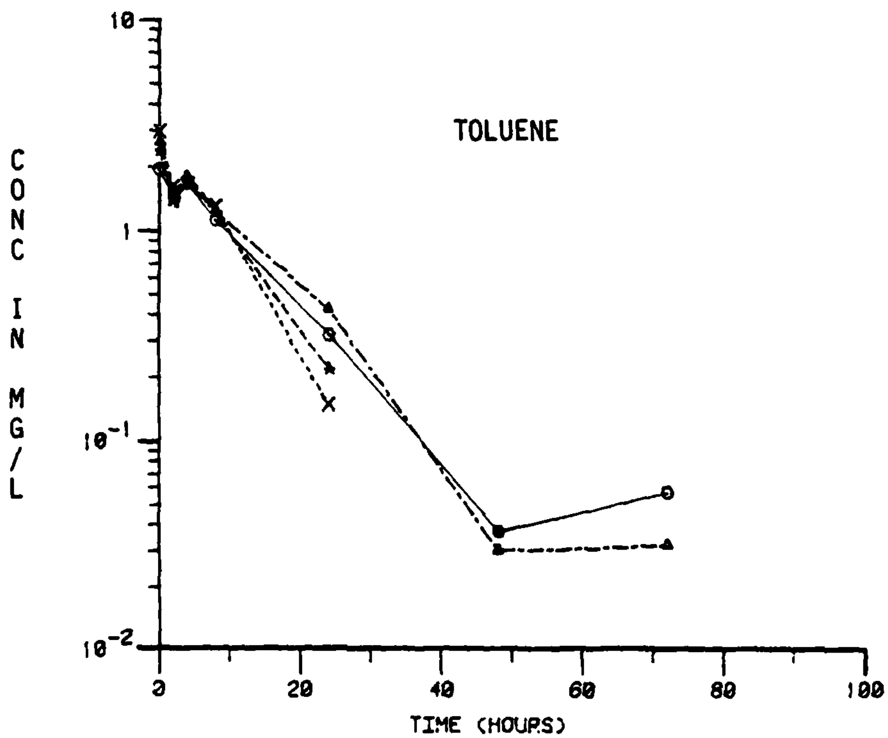


Figure 27. 6-30-82 Escambia River Shaken Fate Screen, JP-4.

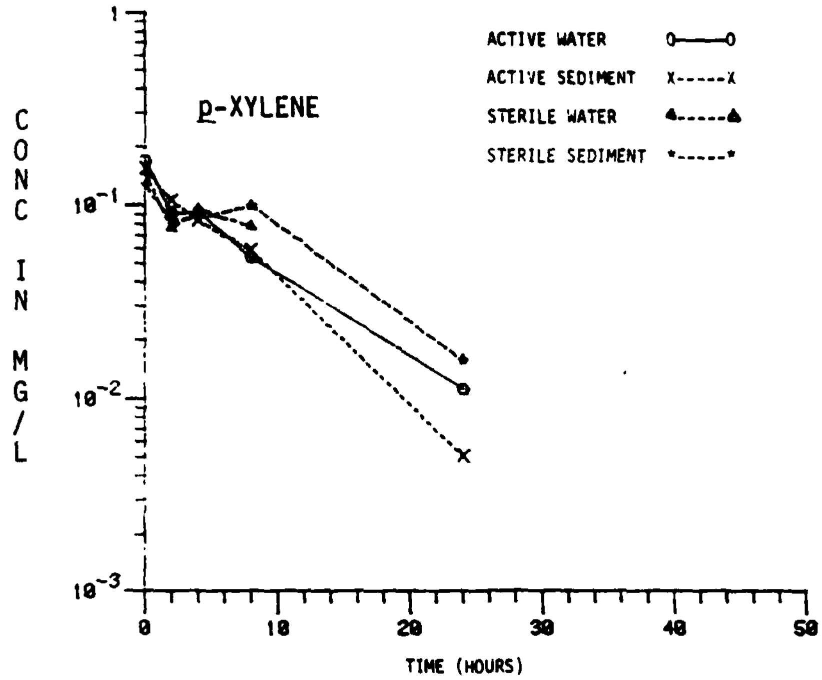


Figure 28. 6-30-82 Escambia River Shaken Fate Screen, JP-4

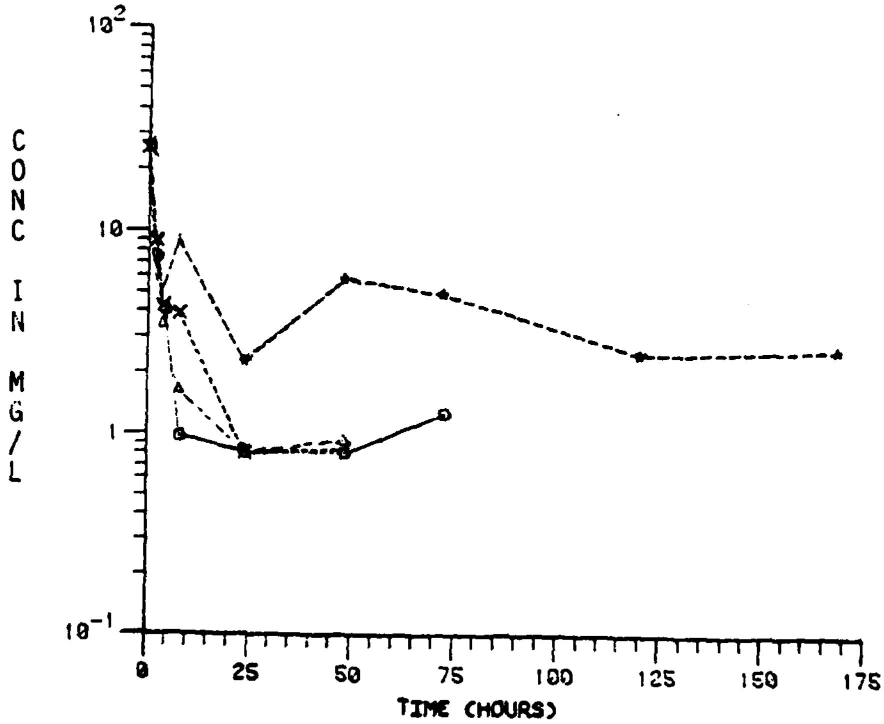


Figure 29. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

When the test was repeated with sediment and water from Range Point the results were essentially the same, except that both toluene and xylene evaporated at a faster rate. Toluene again disappeared faster in the presence of sediment (Figure C-5).

In the JP-4-shaken test with Bayou Chico water and sediment, toluene and xylene were both below detection limits by 24 hours, and toluene disappeared slightly faster in the active sediment flask, but the rate difference was not sufficiently dramatic to clearly indicate biodegradation. Background levels of benzene or a similar compound in samples from Bayou Chico interfered with analysis of benzene in the biodegradation test (Figure C-7).

The compounds monitored during the quiescent tests of JP-4 are identified in Table 2. These represent some of the major constituents of petroleum-derived JP-4 and encompass the entire boiling range of the fuel. The results of the quiescent tests with JP-4 are shown in Appendix D. When the test was conducted with sediment and water from the Escambia River, ethylbenzene, xylene, 1-methyl,3-ethylbenzene, 1,2,4-trimethylbenzene, and 1,4-dimethyl-ethylbenzene showed evidence of biodegradation in the active sediment system (Figures 29-33). None of these compounds were clearly biodegraded in the active water system. Conversely, n-undecane, and naphthalene were biodegraded in the active water flask, but not in the sediment flask (Figures 34,35). Benzene, cyclohexane, and toluene showed no signs of biodegradation, and the results for n-dodecane, 2-methylnaphthalene, n-tridecane, and n-tetradecane were inconclusive.

In the test with Range Point sediment and water, ethylbenzene, 1,2,4-trimethylbenzene, n-decane, 1,4-dimethyl-ethylbenzene, n-undecane, n-dodecane, 2-methylnaphthalene, and n-tridecane were degraded only in the active water flask. The n-tetradecane results suggest biodegradation, but are

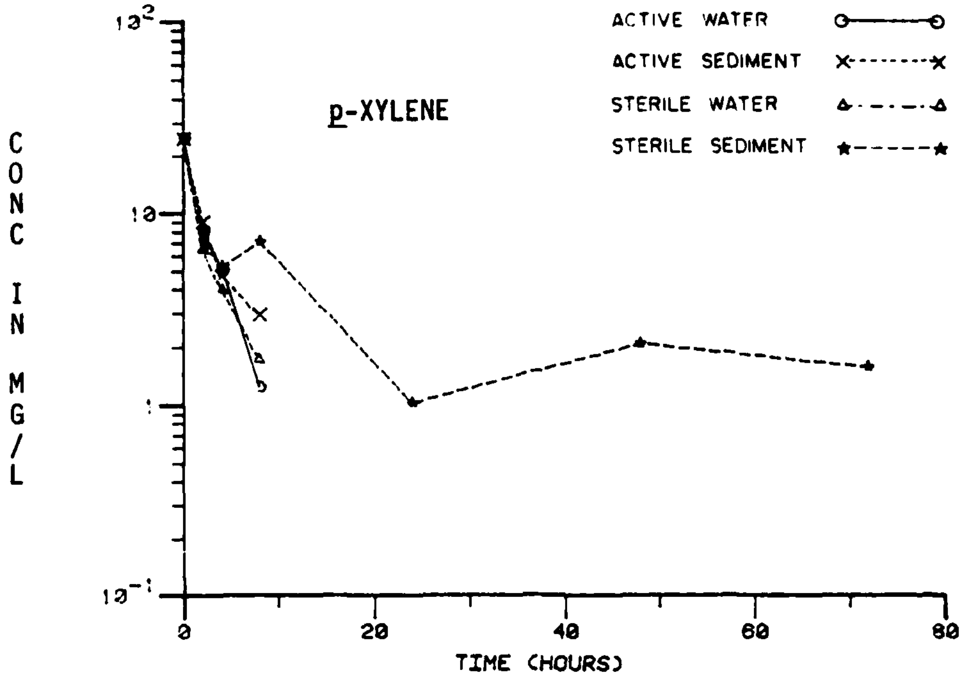


Figure 30. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

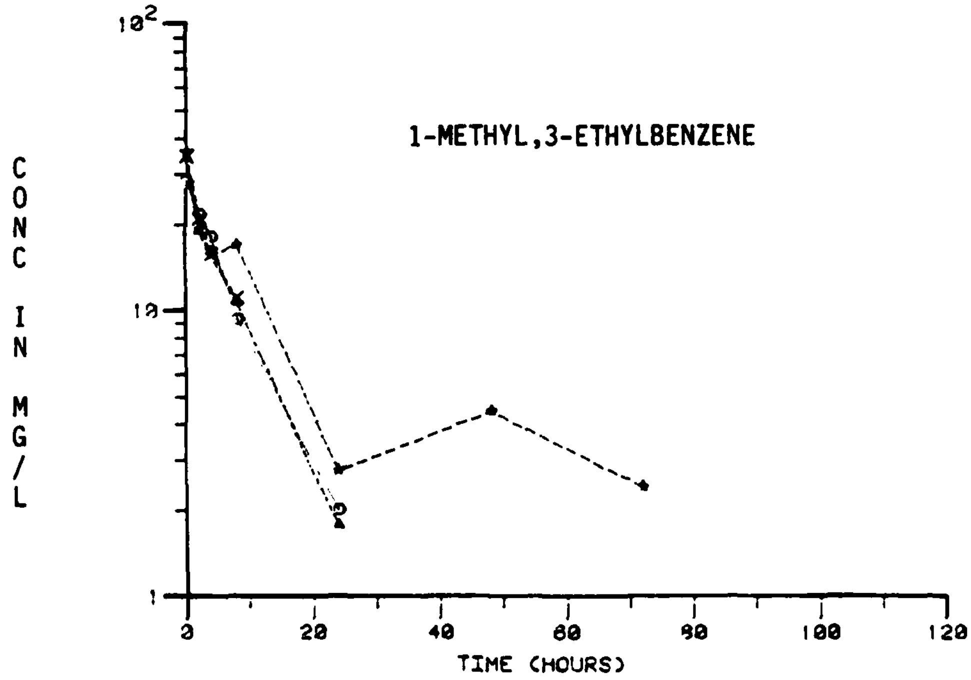


Figure 31. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

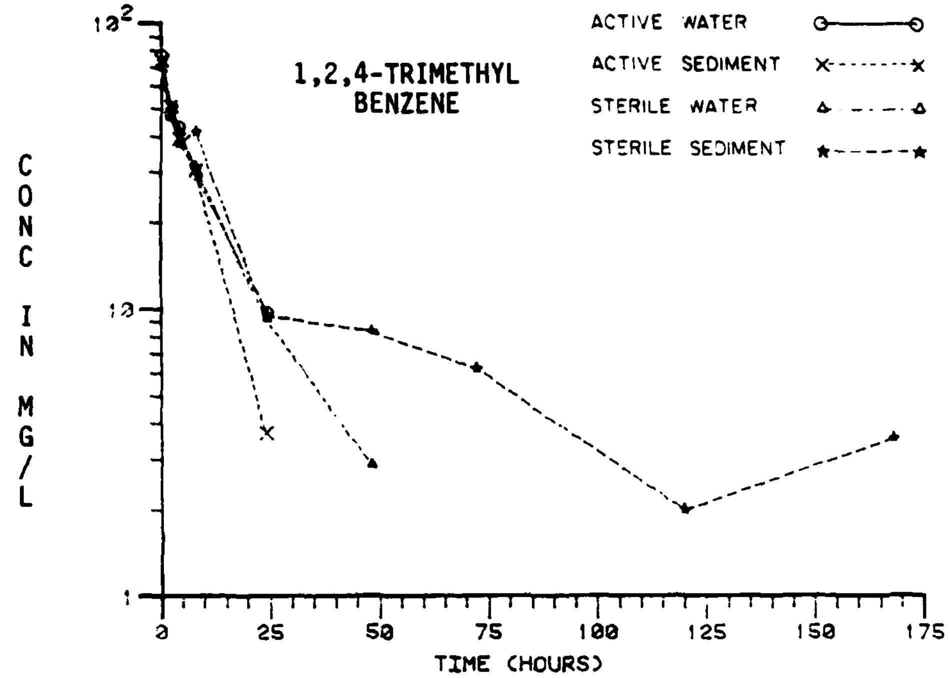


Figure 32. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

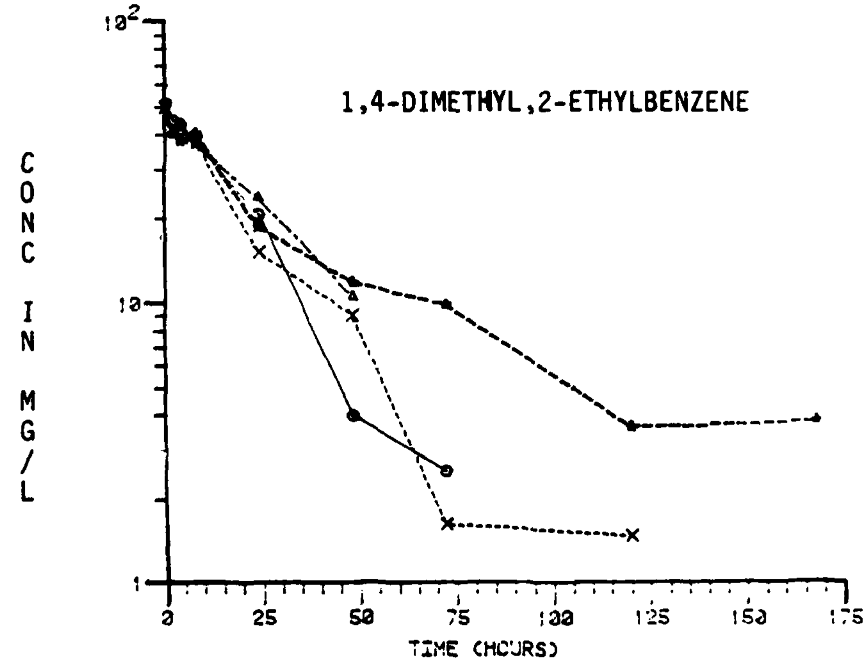


Figure 33. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

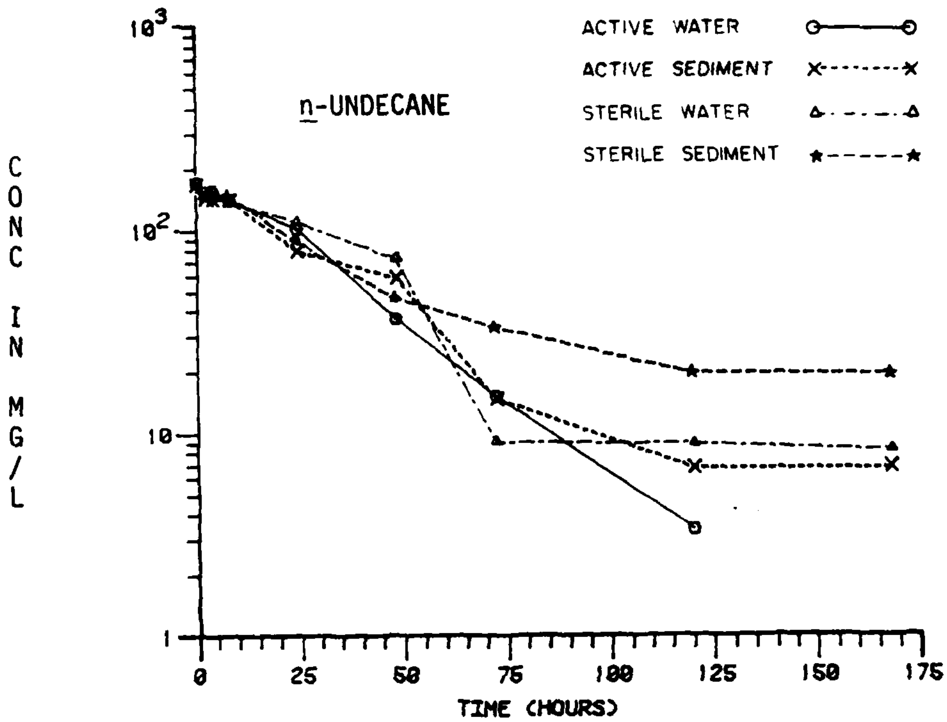


Figure 34. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

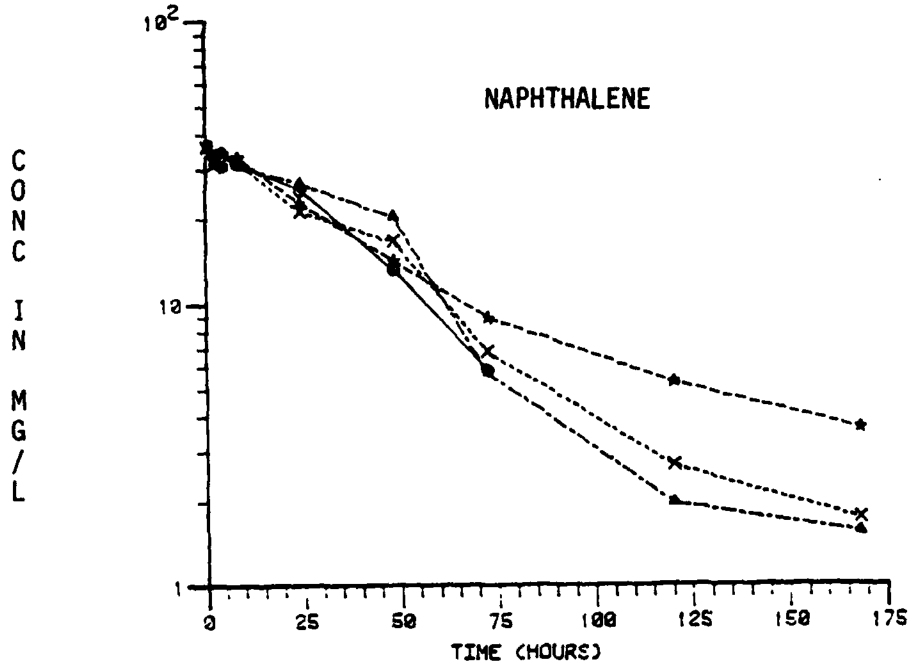


Figure 35. 6-30-82 Escambia River Quiescent Fate Screen, JP-4.

not conclusive. Benzene, cyclohexane, toluene, xylene, and 1-methyl, 3-ethylbenzene showed no evidence of biodegradation (see Appendix D). The sediment-associated degradation in the earlier test and the lack of it in the Range Point test may be the result of differences in the organic content of the sediments. The total organic carbon (TOC) concentration in sediment from Range Point was much higher than that in sediment from the Escambia River site (Table 5). The added organic content may have increased the partitioning of the hydrocarbons into the sediment, and effectively removed them from microbial degradation (Reference 27). In addition the high organic content in the Range Point water may have slowed evaporation of some of the compounds in the water flask sufficiently for biodegradation to occur. Hydrocarbons less tightly associated with the Escambia River sediment may have been more available for microbial attack.

The JP-4 quiescent test for Bayou Chico was unique in that none of the compounds were significantly biodegraded during the 168-hour incubation period (Figures D-46 to D-60). The results indicate that tests with JP-4 must be incubated for longer periods to determine the fate of the more persistent components.

The recovery efficiency of the JP-4 components was much better than that of the model compounds in the quiescent test. The calculated starting concentrations of each of the JP-4 fuel components and the actual recovered value for each test are listed in Table 6. Recoveries in Escambia River and Range Point tests were very similar even though the organic content of the two sediments differed markedly. Results with Range Point sediments were more variable, but JP-4 recovery efficiencies were still considerably higher than those of the model fuel. The lighter compounds, such as benzene and cyclohexane, were recovered less efficiently than those with higher molecular

Table 6. HYDROCARBON RECOVERIES FROM JP-4 QUIESCENT TESTS. CONCENTRATIONS OF INITIAL SAMPLES IN mg/l.

Compound	Expected Conc.	Escambia River 6-30-82				Range Point 7-28-82				Bayou Chico			
		AW	AS	SW	SS	AW	AS	SW	SS	AW	AS	SW	SS
Benzene	38.03	18.47	17.70	20.10	18.67	21.33	22.17	27.90	19.80	23.80	23.17	28.03	27.70
Cyclohexane	94.44	69.30	64.97	70.93	66.93	67.17	74.43	91.17	64.60	55.53	60.30	74.93	71.03
Toluene	101.29	85.80	83.47	84.43	81.67	93.23	91.03	114.90	79.57	62.87	70.60	88.93	84.70
Ethylbenzene	28.18	25.70	25.07	25.00	26.20	28.23	26.50	32.83	23.20	17.57	20.07	26.73	24.33
p-Xylene	26.66	24.87	24.60	24.17	24.80	26.90	25.27	31.67	22.13	16.70	18.97	25.30	23.00
1-Methyl,3-ethylbenzene	37.32	28.47	34.53	34.23	35.90	39.07	35.87	44.43	31.47	24.07	27.77	37.00	33.47
1,2,4-Trimethylbenzene	76.92	77.30	73.50	69.13	73.77	80.57	77.97	95.70	67.17	50.27	58.67	78.83	71.43
n-Decane	164.51	160.80	155.23	153.43	158.70	173.47	160.17	197.50	141.00	107.37	125.63	167.47	151.87
1,4-Dimethyl,2-ethylbenzene	53.31	50.93	49.63	48.73	51.47	55.07	51.07	62.17	55.30	35.63	47.20	56.87	44.70
n-Undecane	176.69	171.20	166.27	164.13	169.20	180.73	168.73	204.17	150.07	117.73	141.00	187.13	117.73
Naphthalene	38.03	36.80	35.37	35.17	36.87	38.73	35.97	43.47	31.83	25.50	30.83	40.27	36.07
n-Dodecane	152.32	164.07	152.20	149.57	168.67	173.83	164.57	198.03	141.40	110.37	138.57	179.77	160.70
2-Methylnaphthalene	42.65	40.03	38.93	34.73	40.77	41.60	39.60	47.40	35.33	29.00	35.60	45.37	40.50
n-Tridecane	115.76	110.53	105.47	103.30	106.07	116.03	110.93	136.23	98.47	77.93	95.47	127.27	111.13
n-Tetradecane	55.60	54.63	52.90	51.43	54.23	54.37	52.97	64.70	47.60	41.13	50.50	62.50	56.63

weights because of their tendency to volatilize during handling.

B. MICROBIOLOGY

Assays for total heterotrophic bacteria and for hydrocarbonoclastic bacteria indicated that the model fuel mixture exerted an acute toxicity on the microbial community in both the shaken and quiescent tests from Escambia River and Range Point. The toxicity in the shaken test was due to the relatively high fuel-to-water ratio required during the preparation of the WSF. The bacterial communities in the exposed flasks recovered by 24 hours, and in most cases were larger than those in the control flasks before the end of the test period (Figure 36). The toxicity was less evident in flasks that contained sediment (Figure 37), probably due to the additional organisms transferred into the flasks with the sediment. The rapid increase in microbial numbers in the flasks that received hydrocarbons was largely due to the growth of hydrocarbonoclastic organisms.

The toxicity in the quiescent test was more pronounced due to the higher concentration of hydrocarbons. In contrast to the shaken test, the hydrocarbon surface layer remained in contact with the samples throughout the incubation period. The concentration of the hydrocarbons was decreased only by evaporation. Bacterial numbers in the exposed quiescent flasks declined over the first 24 hours of the test period, indicating a sustained toxicity, and then increased over the remainder of the test (Figures 38,39). The lengthened period of toxicity in the quiescent test corresponds to the time required for evaporation of the most volatile compounds, and may have been partly responsible for the recalcitrance of the model fuel components in this test.

Model fuel mixtures were not toxic to the microbial community in the shaken tests with samples from Bayou Chico (Figures 40), probably due to the regular exposure of Bayou Chico to pollutants. The model fuel quiescent tests

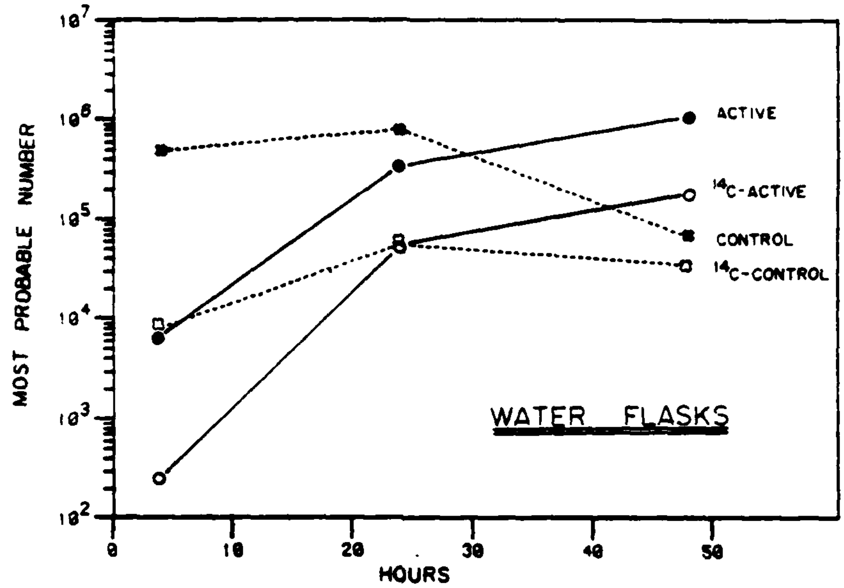


Figure 36. Microbial Numbers in Exposed and Control Water Shake Flasks. ACTIVE: Indicates Exposed Flasks. ^{14}C-: Indicates Hydrocarbonoclastic Bacteria Enumerated by the ^{14}C-MPN Method.

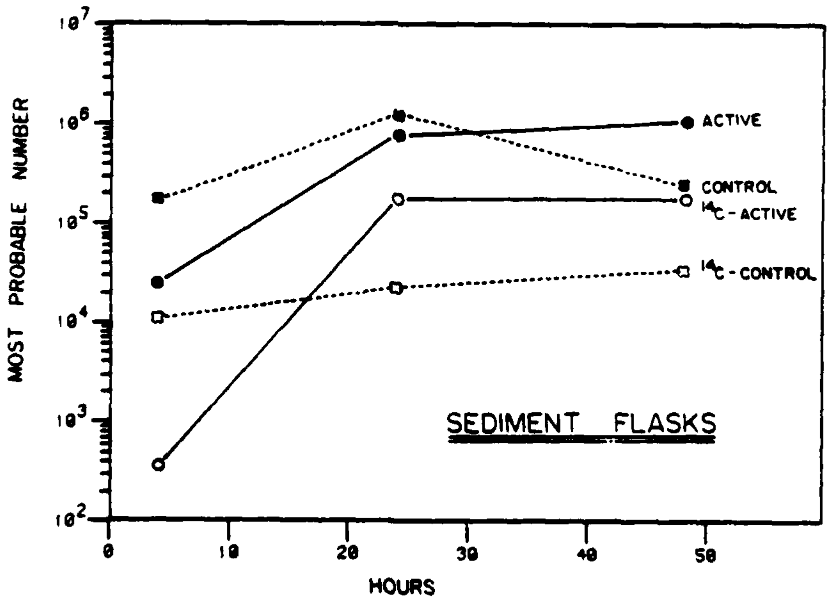


Figure 37. Microbial Numbers in Exposed and Control Sediment Shake Flasks. (See Figure 36).

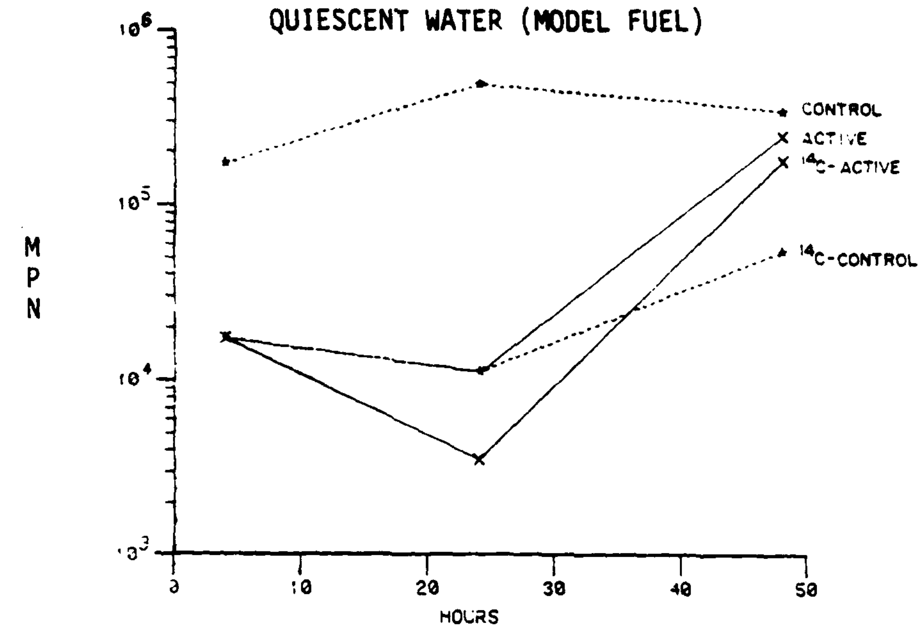


Figure 38. Microbial Numbers in Exposed and Control Quiescent Water Flasks (MPN/ml).

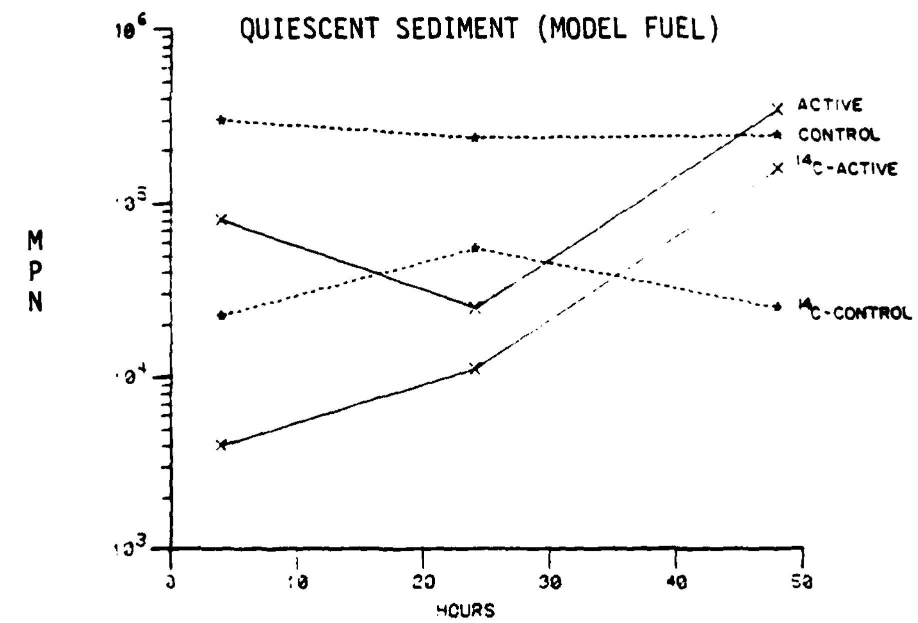


Figure 39. Microbial Numbers in Exposed and Control Quiescent Sediment Flasks (MPN/ml).

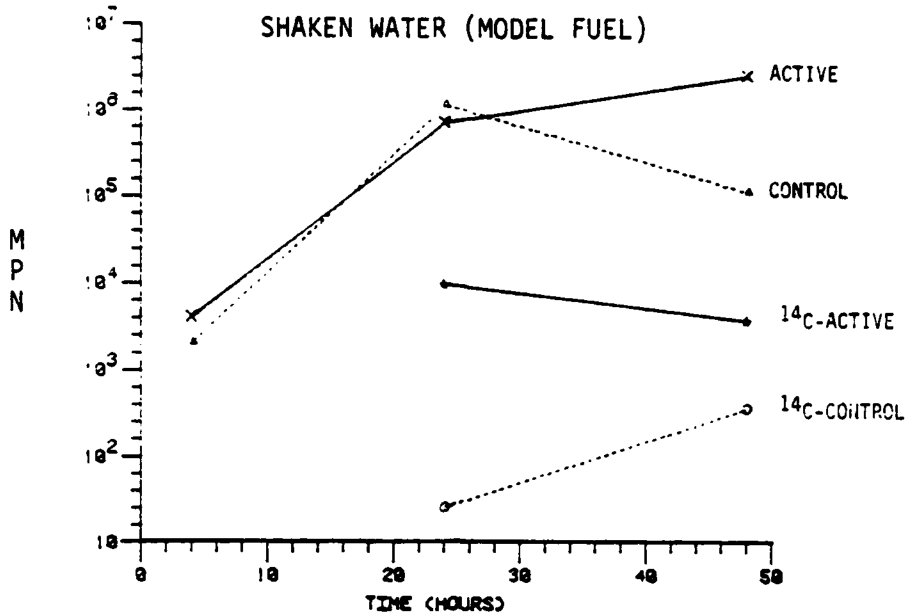


Figure 40. Microbial Numbers in Exposed and Control Shaken Water Flasks (MPN/ml). Samples From Bayou Chico Site.

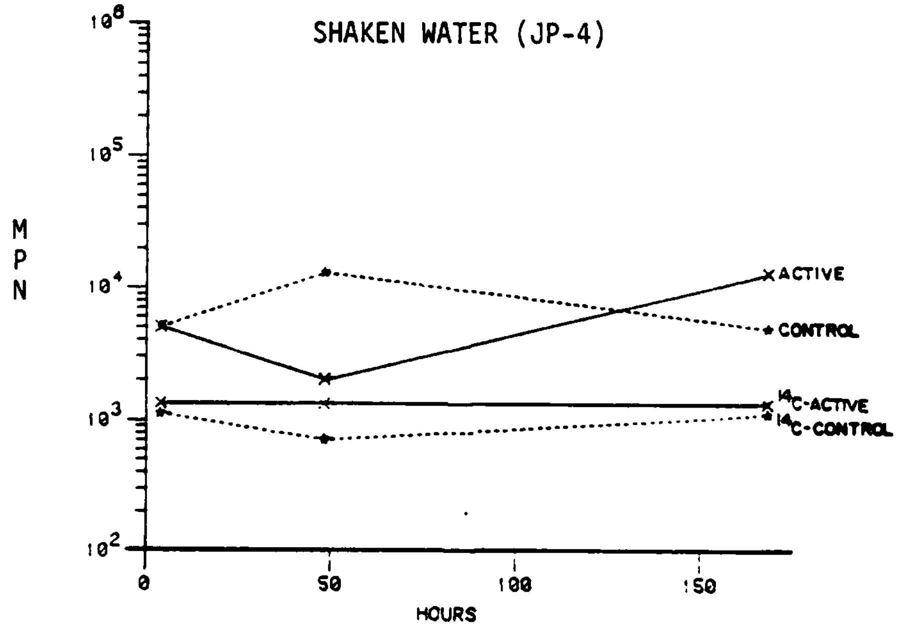


Figure 41. Microbial Numbers in Exposed and Control Shaken Water Flasks (MPN/ml).

with Bayou Chico samples resulted in toxic effects similar to those observed at the other sites.

JP-4 was not nearly as toxic to the microbiota in either shaken or quiescent tests. Initial biomass in samples from both shaken and quiescent experimental flasks were not significantly different from control samples during most tests and no lag periods were noted before population growth (Figures 41-44). The lack of toxicity in these tests probably facilitated the rapid degradation of some of the compounds in the quiescent systems. The Bayou Chico microbial communities behaved similarly to those of the other test sites, in spite of the fact that they did not degrade JP-4 (see above).

The size of the microbial population and the percentage of the population capable of degrading hexadecane did not vary significantly from site to site (Appendix F), and there was no correlation between biodegradation rates and microbial biomass. These results do not support the prediction of biodegradation potential based on biomass measurements.

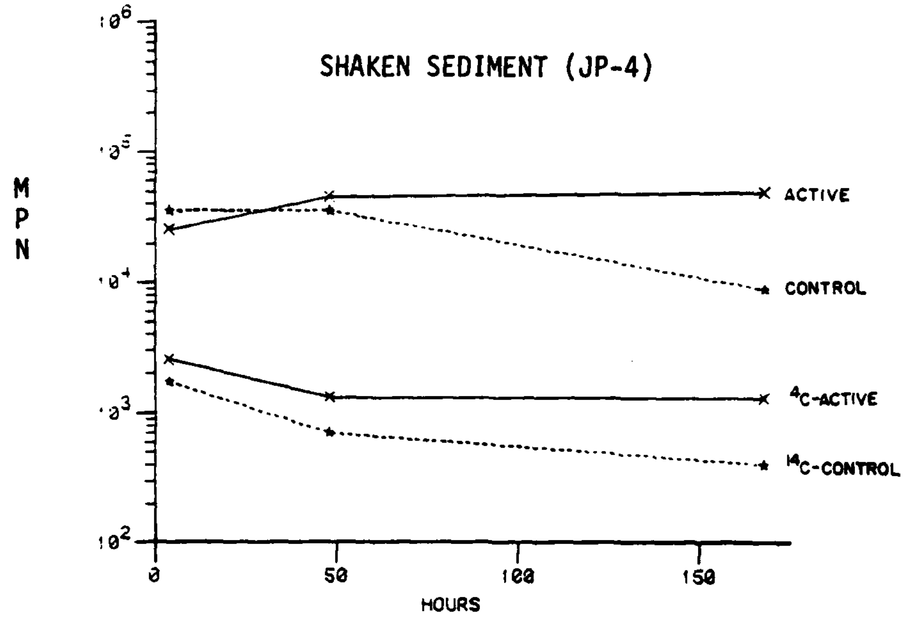


Figure 42. Microbial Numbers in Exposed and Control Shaken Sediment Flasks (MPN/ml).

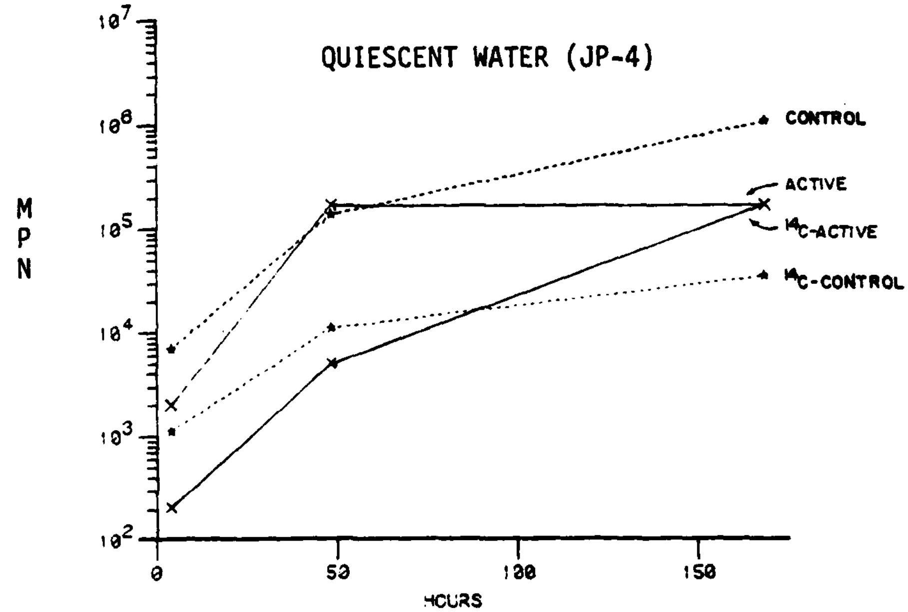


Figure 43. Microbial Numbers in Exposed and Control Quiescent Water Flasks (MPN/ml).

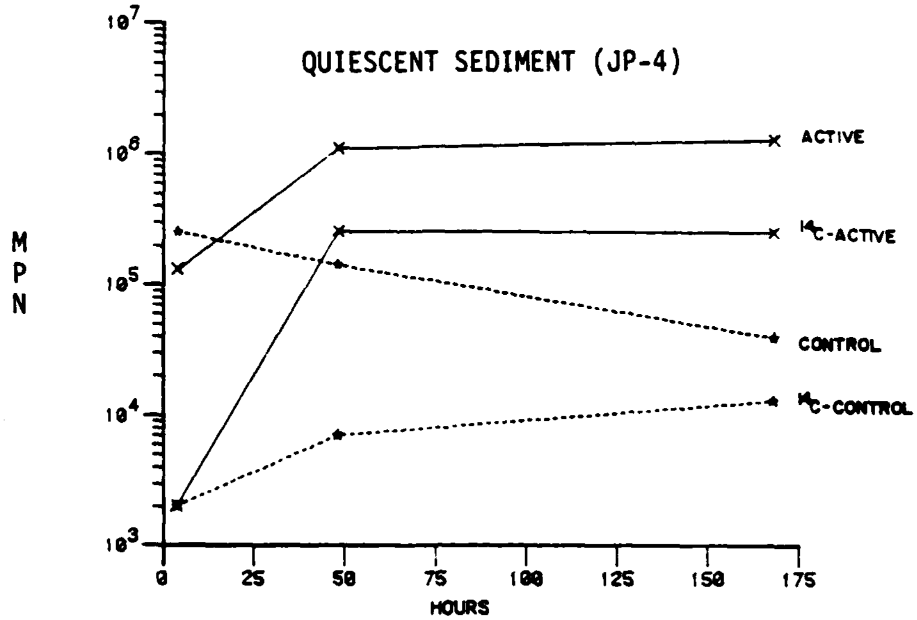


Figure 44. Microbial Numbers in Exposed and Control Quiescent Sediment Flasks (MPN/ml).

SECTION V

CONCLUSIONS

The preliminary tests with the model fuel have proven the value of a simplified fuel mixture in predicting certain aspects of the fate and behavior of complex distillate fuels released into the environment. The equal-weight model mixture accurately predicted the behavior of the hydrocarbon classes of JP-4 with respect to volatilization rates, solubility and, in some instances, biodegradation potential. The construction of a model fuel with a limited number of constituents causes an increase in the concentration of each constituent. This facilitates the study of the fate of each compound in a mixture of hydrocarbons, which may be very different from the fate of pure compounds. In some instances, however, the increased concentration of compounds in the mixture causes misleading results. Such was apparently the case with the toxic effect of the model mixture, and the recalcitrance of the model compounds in the quiescent test. The greater concentration of each of the components in the model fuel tests probably contributed to the observed differences in sedimentation between the model fuel and JP-4. Compounds that were monitored both in JP-4 and the model mixture under very similar conditions of sediment load and TOC concentration, and with the same incubation and extraction procedures produced very different results when the initial concentrations were significantly different. The model fuel is best used to generate general information regarding the behavior of hydrocarbon classes, but should not be used to replace tests with actual fuel mixtures.

The fate of jet fuels released into the aqueous environment depends on a number of interrelated factors. These tests indicate that biodegradation may be an important fate process only when conditions are favorable for microbial activity and when the fuel components are available to degradation. The

conditions that can be expected to influence microbial activity include temperature, salinity, pH, oxygen tension, and nutrient concentrations. The availability of the fuel to degradation is more complex and depends on the circumstances that surround the release of the fuel, chemical and physical characteristics of the fuel components, the organic content and resuspension of the underlying sediment, the depth of the water, and water conditions. Results obtained to date in this project, and results from other studies already conducted with light fuel mixtures, allow preliminary predictions of the behavior of fuels such as JP-4 under certain conditions.

In situations where JP-4 is released onto the surface of a water body, or where the water is sufficiently deep to preclude sedimentation, evaporation and chemical weathering will be the only measurable fate processes. If the spill is large and is confined to a relatively small area, the fuel may cause a toxic effect upon the microbiota that will dissipate as the fuel is removed. Taxonomic shifts in the microbial community after a jet fuel spill have not been studied, and may be an important result of an accidental release. In general, however; the fuel would not persist long in the environment.

A radically different outcome would likely result from release of the fuel into shallow, turbid water overlying an organically rich sediment such as would be found in salt marshes and estuaries. Test results indicate that a number of fuel components could become sorbed to the sediment and would resist chemical and biological weathering. Such results have, in fact, been noted in actual shallow water spills (References 6, 16). For compounds not sequestered in the sediments, biodegradation and evaporation would be the dominant fate processes.

Temperatures would also be important in determining the fate of fuel, released into the environment. Arctic temperatures would retard both

evaporation and biodegradation, thus increasing the persistence of the fuel, even in situations where sedimentation is minimal (Reference 17).

Prediction of the fate and behavior of the fuel would be more difficult in situations of intermediate mixing and sedimentation. Where sorption is not irreversible the major competing processes would be evaporation and biodegradation. Compounds with nine carbon atoms or fewer would be weathered almost exclusively by evaporation. Larger compounds would be affected both by evaporation and biodegradation. Compounds with 14 carbon atoms and higher, and highly substituted aromatic compounds resist both processes somewhat. It will be necessary to extend the time period of laboratory tests to obtain information on the persistence of such compounds.

The prediction of biodegradation rates for various components of a fuel mixture is complicated by the number of variables that affect microbial activity and the degradation potential of the fuel compounds. Rates calculated under optimum conditions in the laboratory with pure compounds or simplified mixtures will probably not resemble in situ degradation rates. The slope values presented in Appendices E and F may serve as points of comparison between compounds or between sites tested, but should not be assumed to represent expected rates of loss under natural conditions. Microbiological results do not support the prediction of biodegradation based on biomass measurements. Various studies suggest that the previous site-exposure history is important in determining the microbial capacity to degrade a contaminant (References 14, 22, 23). This is probably a much more important factor in determining the impact of a spill on a given location than are measurements of microbial numbers.

Further testing is required to determine the nature of the sediment-mediated persistence of certain hydrocarbon compounds. Cleanup efforts after an accidental release would likely be quite different if recalcitrance were

related to physical or chemical bonding as opposed to anaerobic inhibition of biodegradation within the sediment layers. Future testing of these and other Air Force fuels under the present agreement will include longer incubation periods and a continued emphasis on examining the importance of sediment effects.

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APPENDIX A

MODEL FUEL - SHAKEN TESTS

4-5-82 to 8-10-82

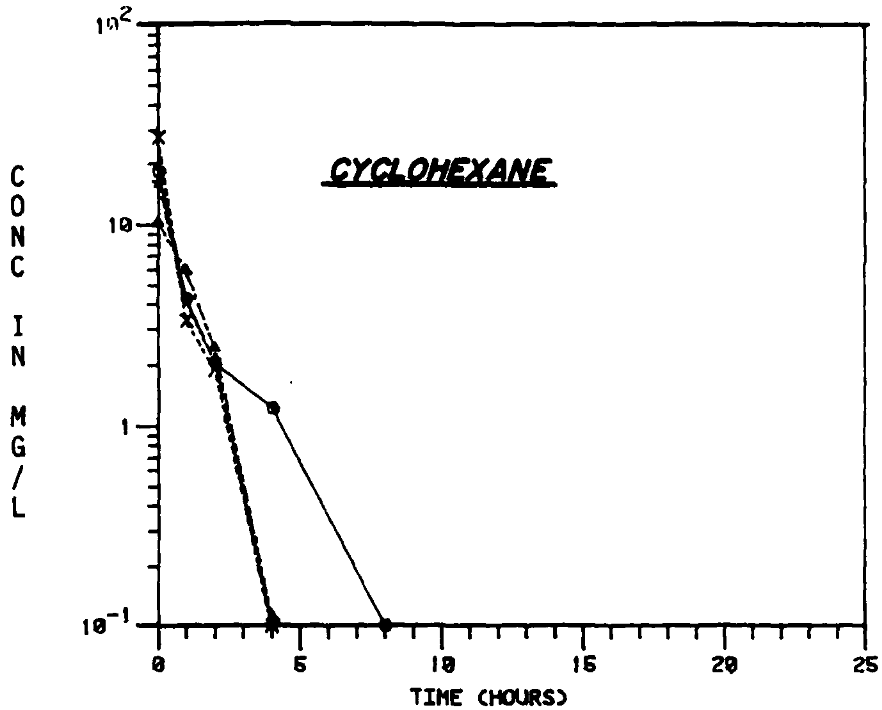


Figure A-1. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

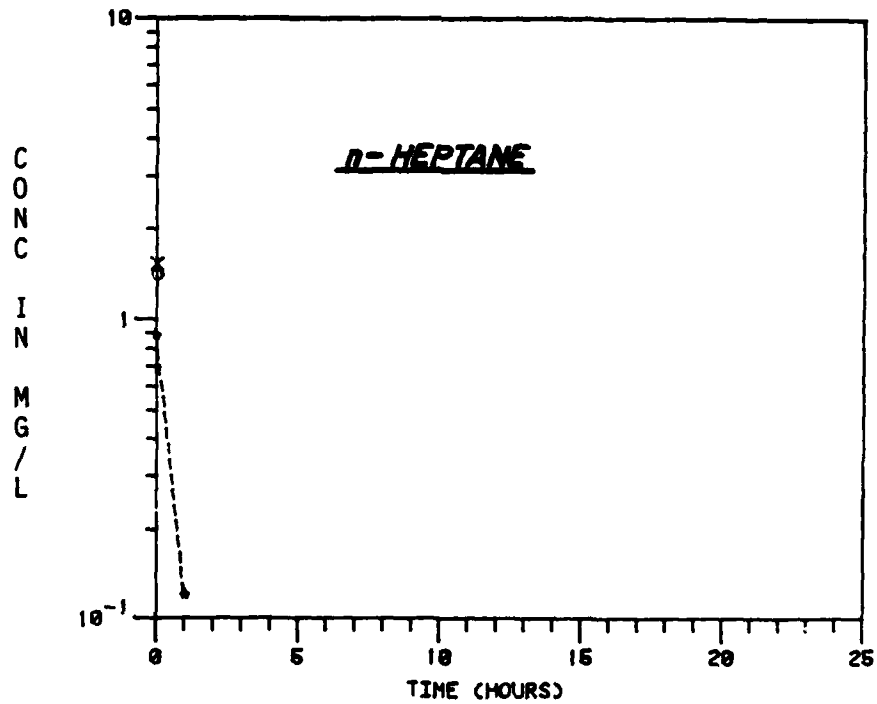


Figure A-2. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

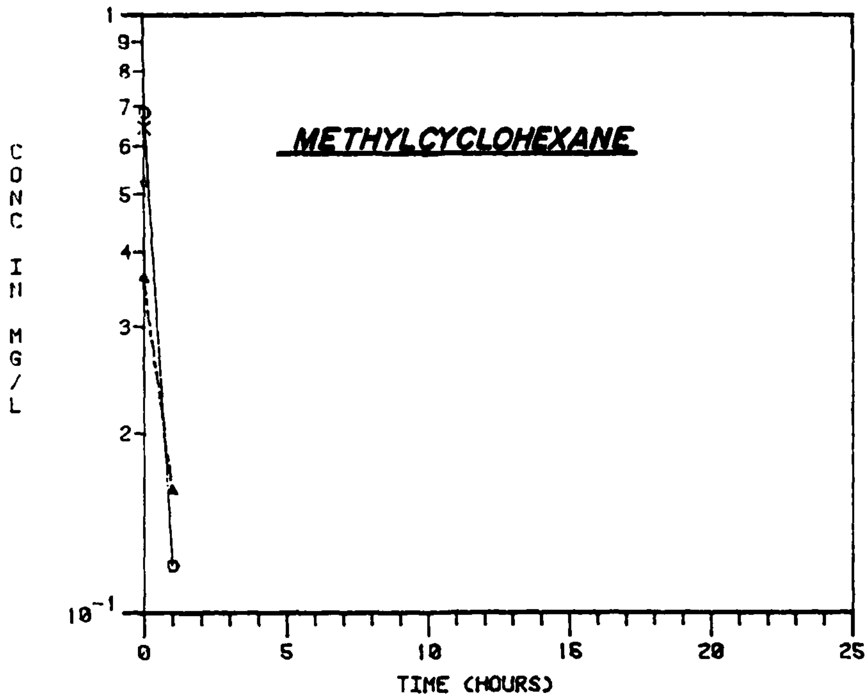


Figure A-3. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

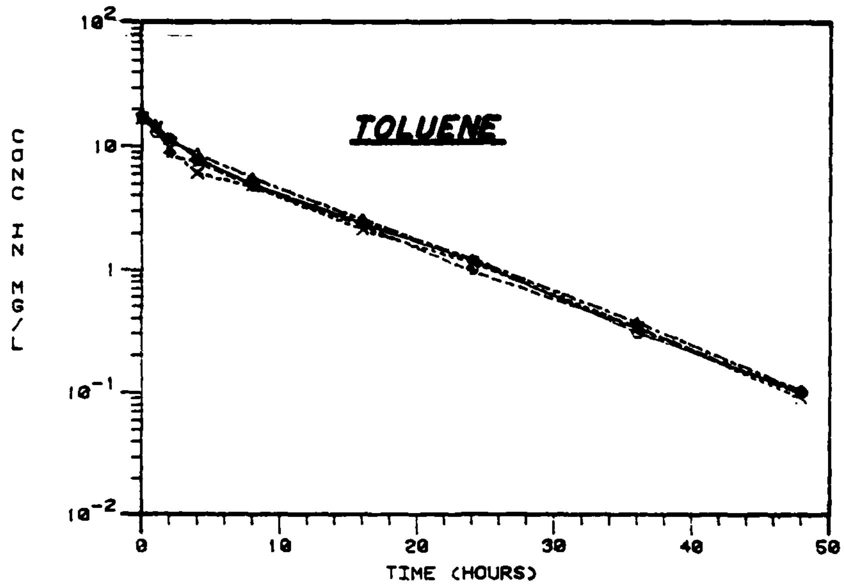


Figure A-4. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

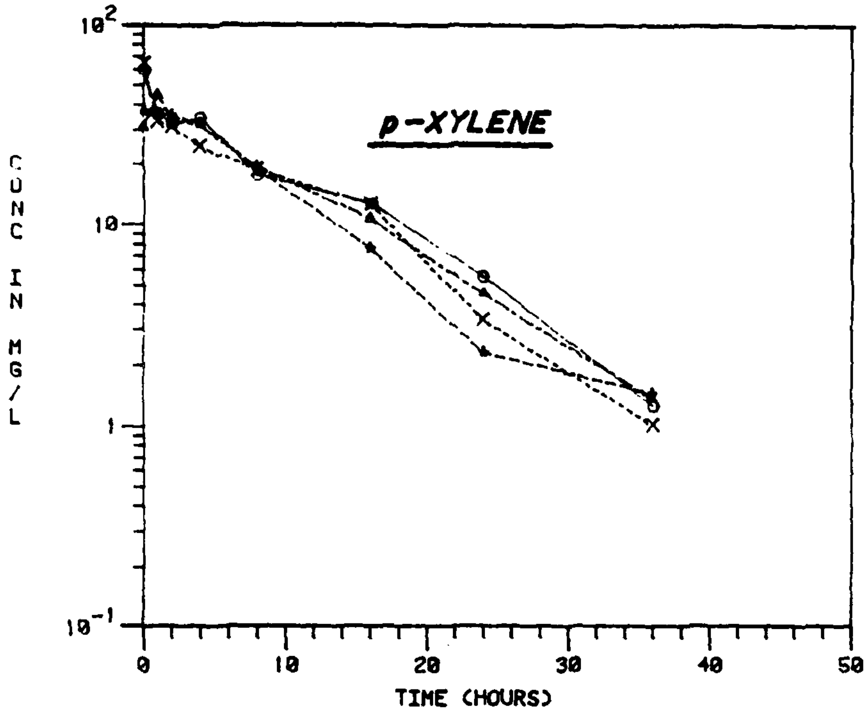


Figure A-5. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

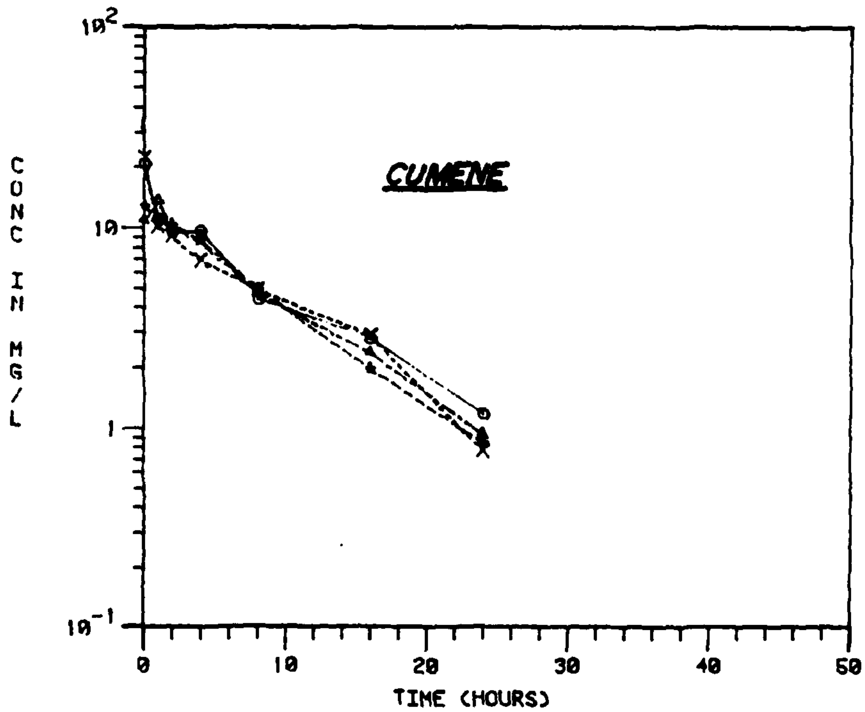
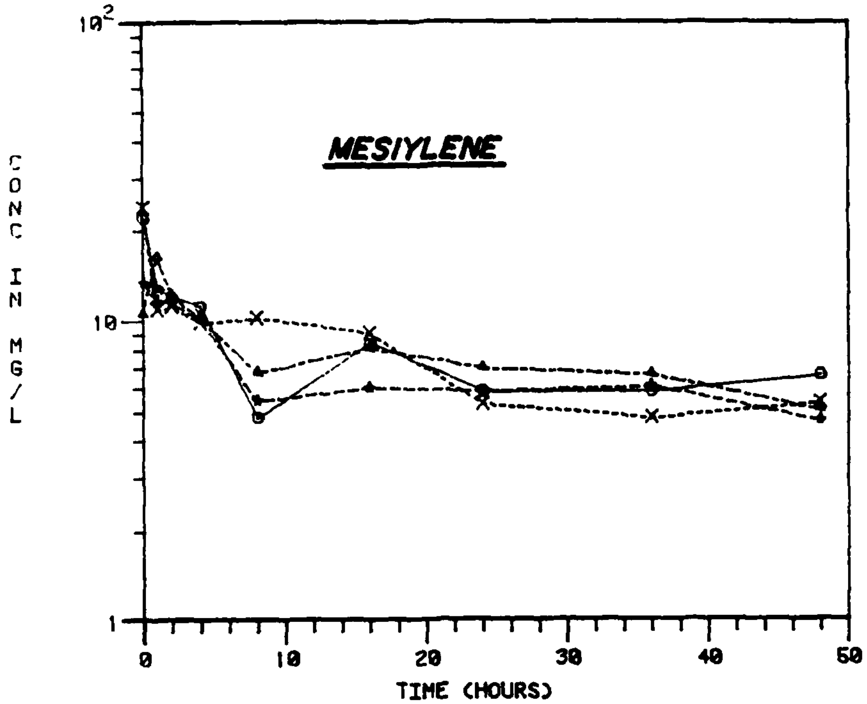


Figure A-6. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.



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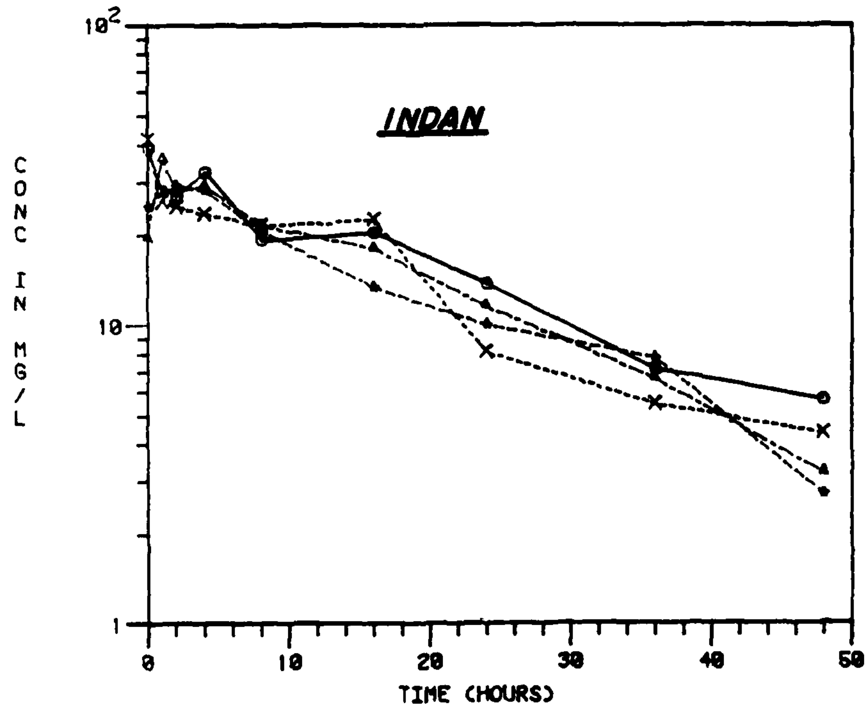


Figure A-8. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

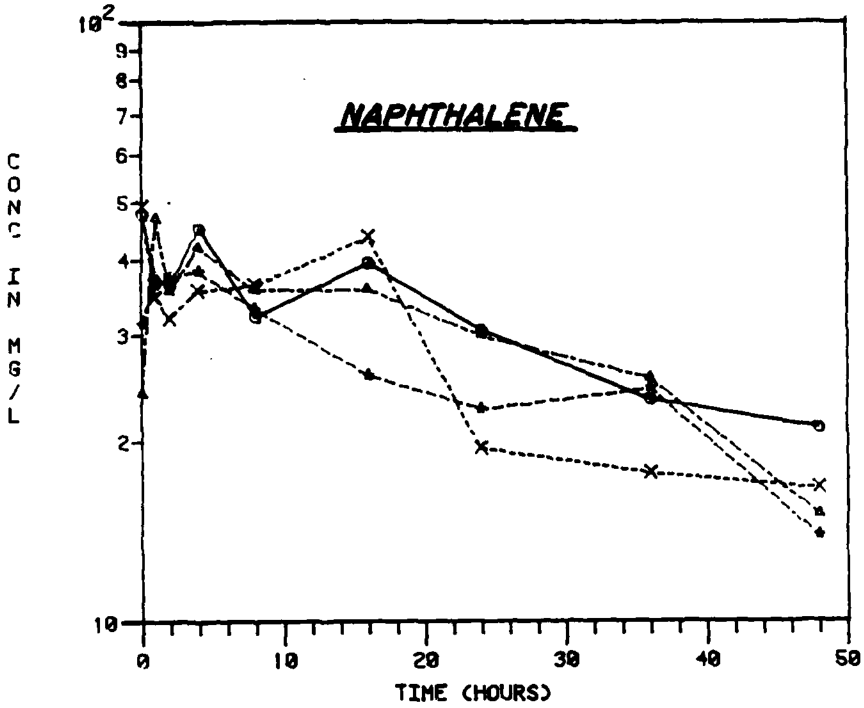


Figure A-9. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

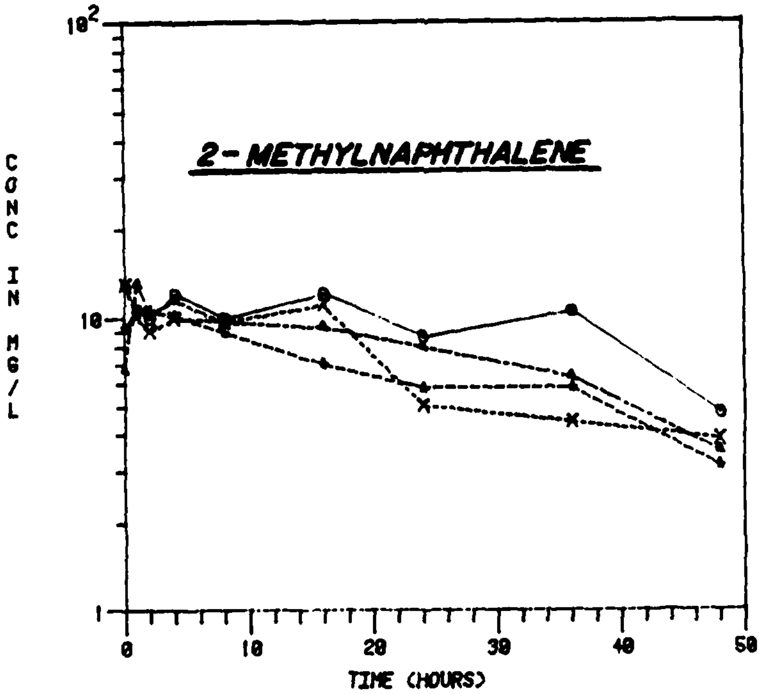


Figure A-10. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

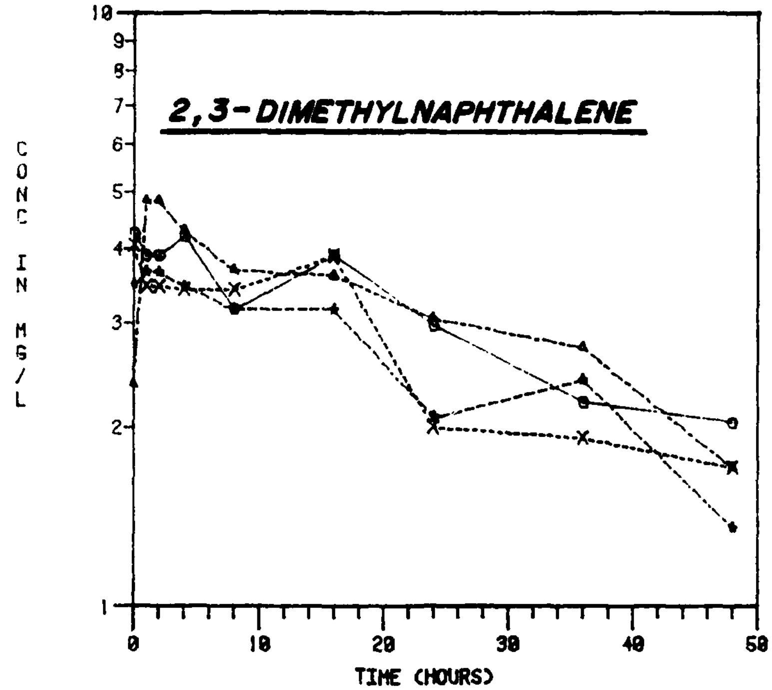


Figure A-11. 4-5-82 Escambia River Shaken Fate Screen, Model Fuel.

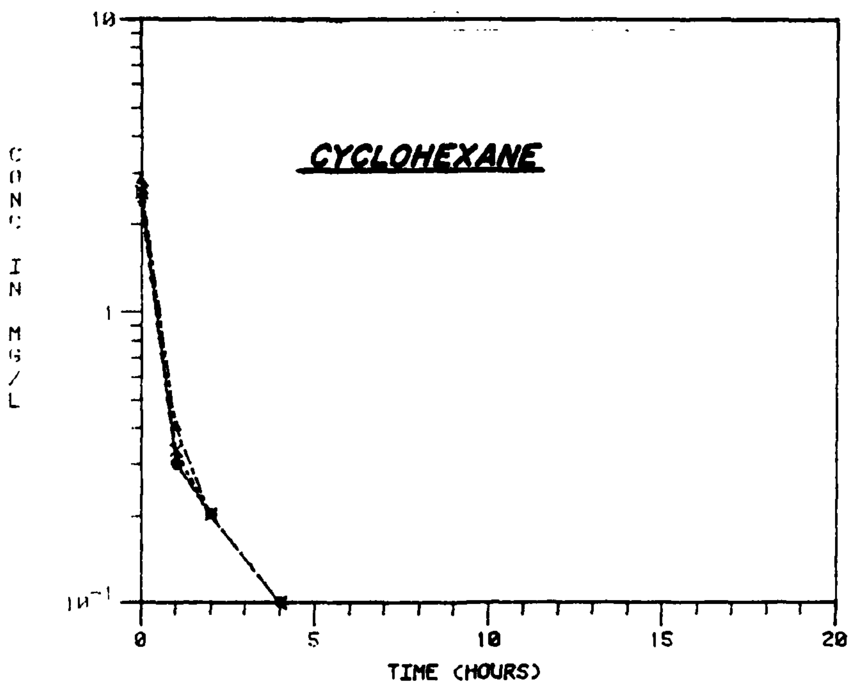


Figure A-12. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

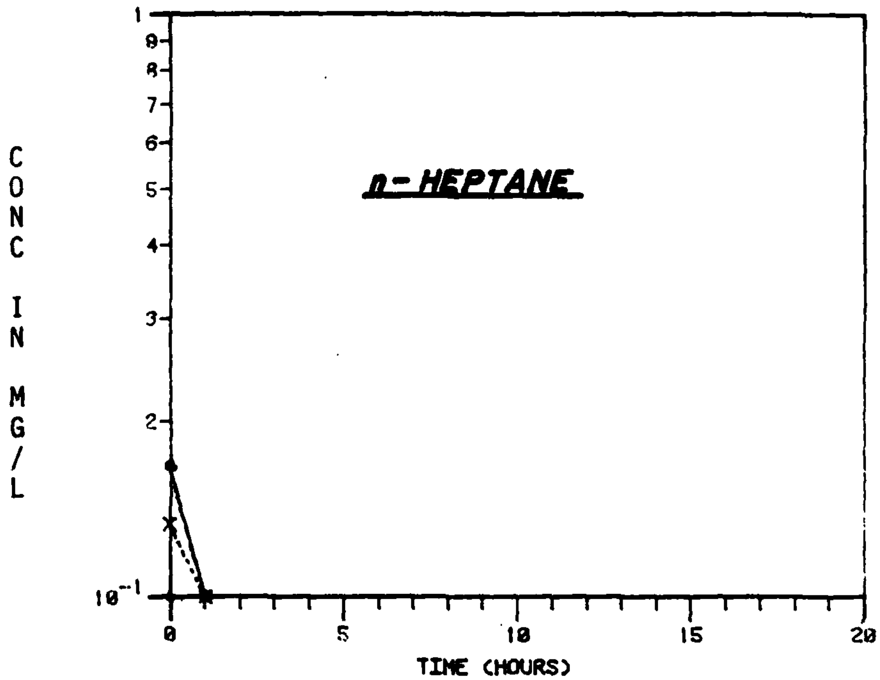


Figure A-13. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

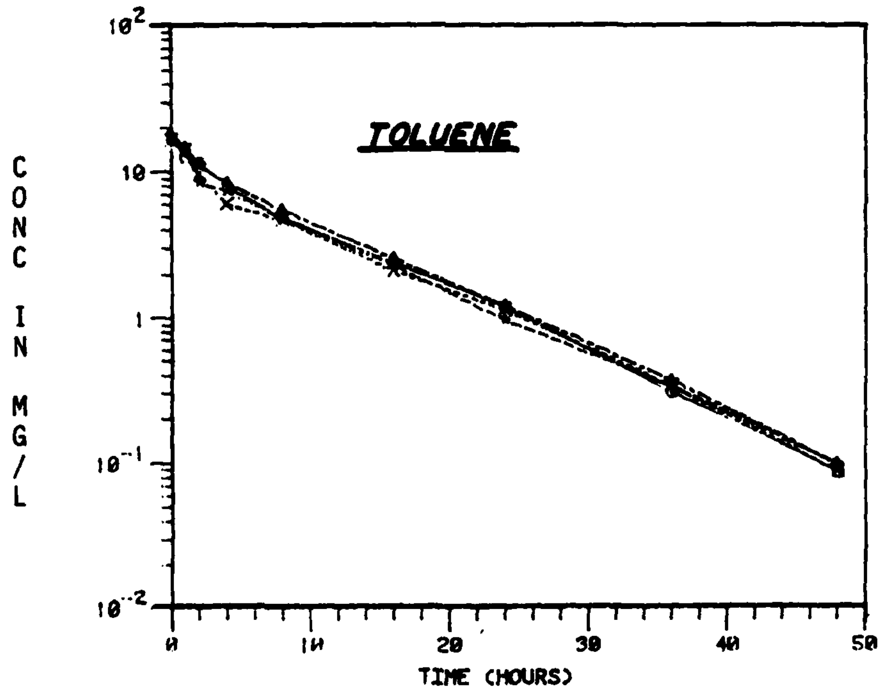


Figure A-14. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

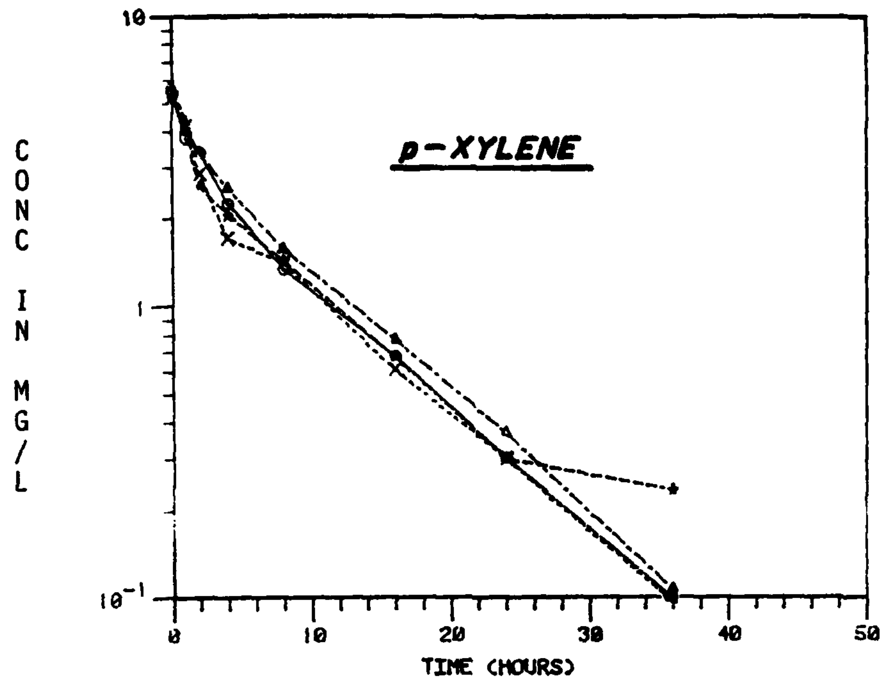


Figure A-15. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

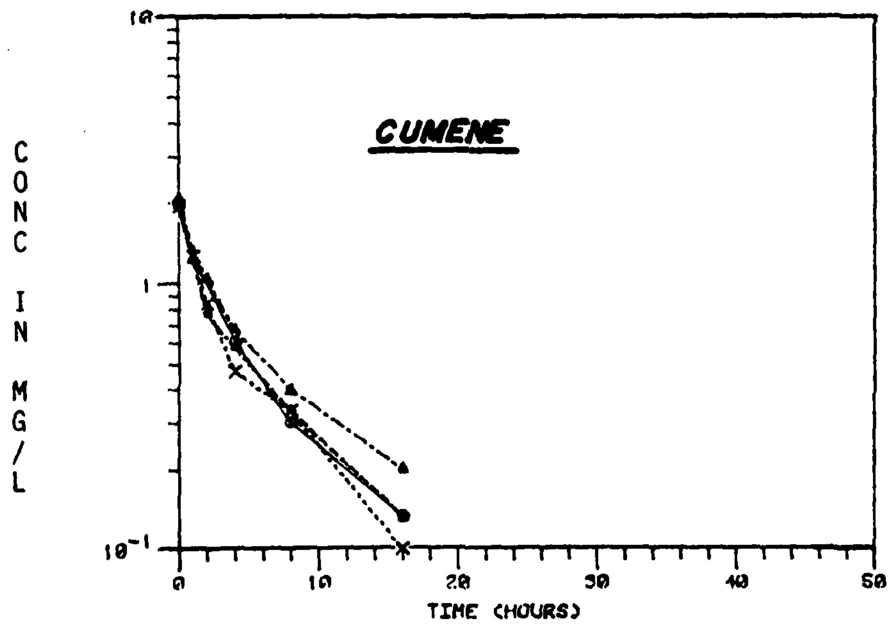


Figure A-16. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

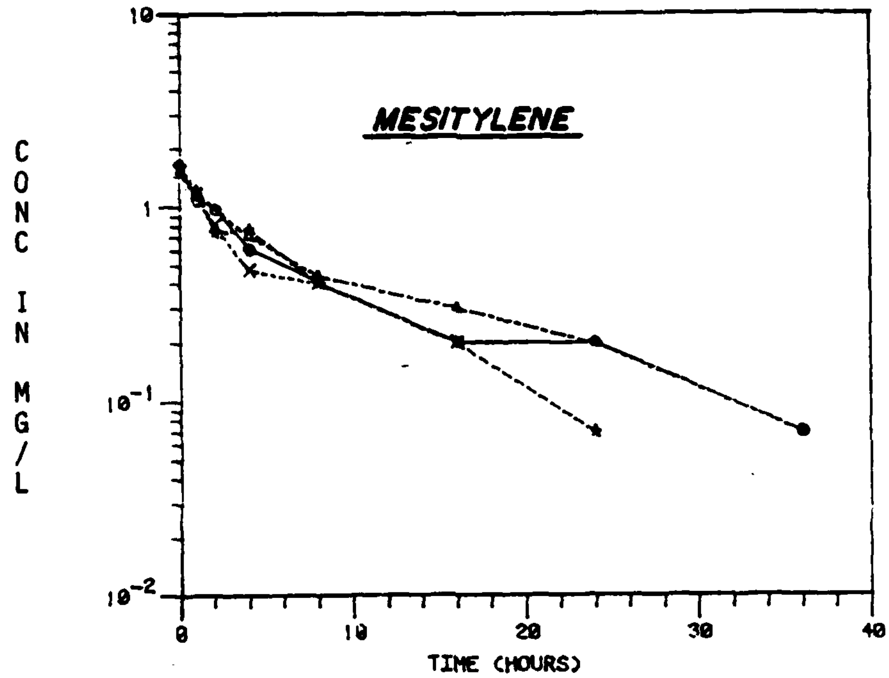


Figure A-17. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

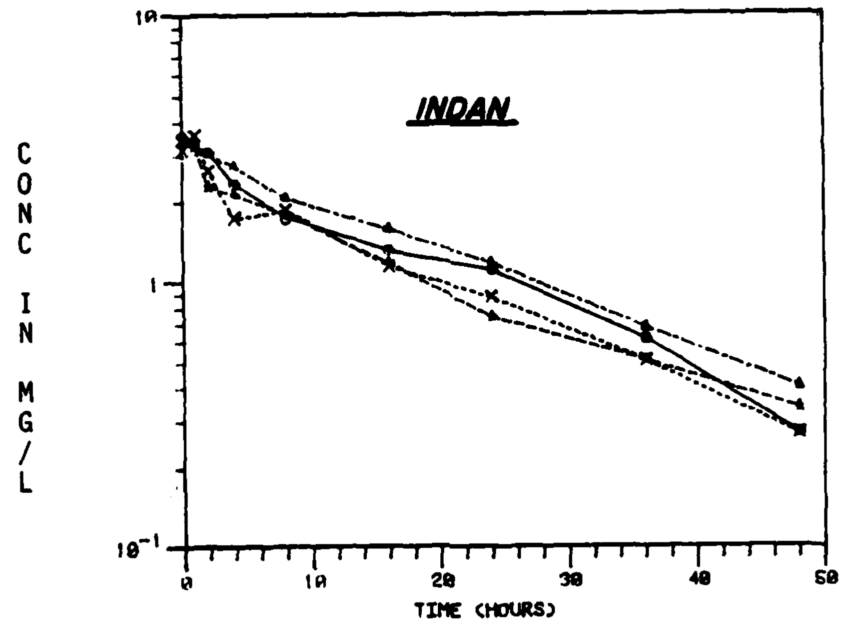


Figure A-18. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

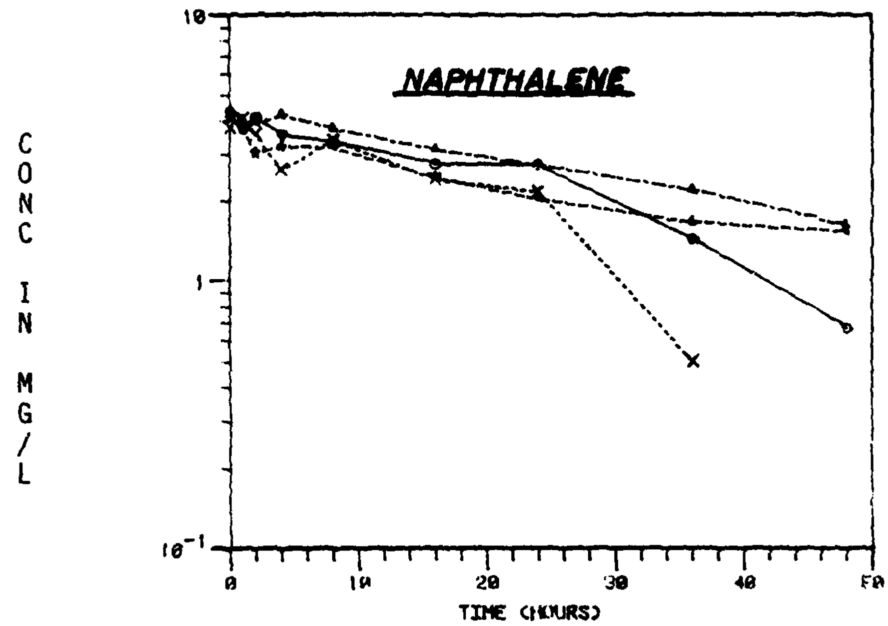


Figure A-19. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

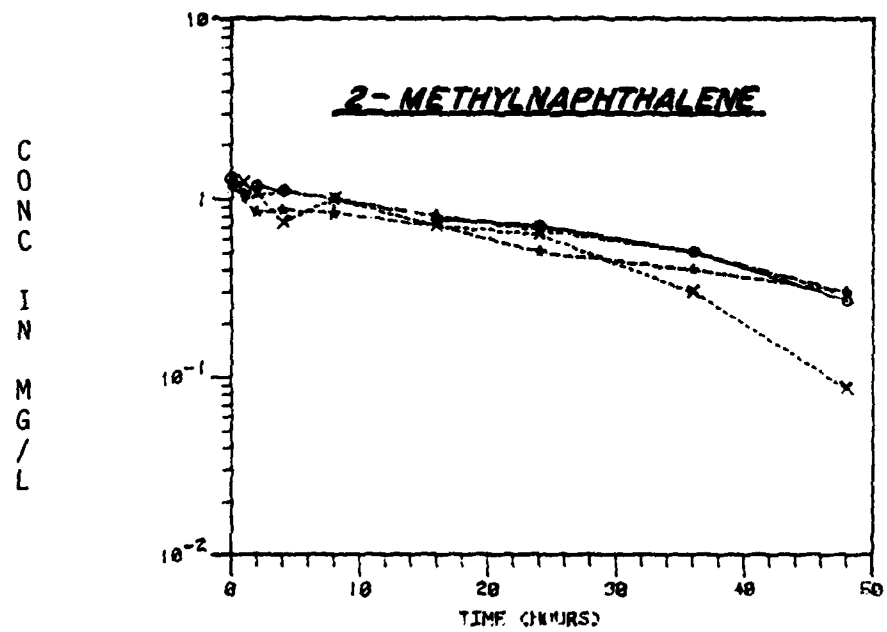


Figure A-20. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

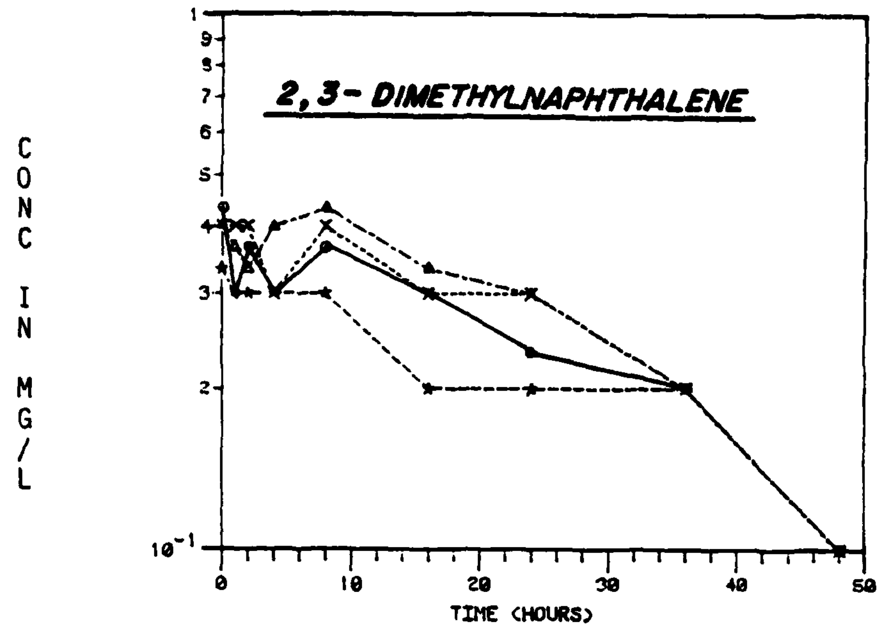


Figure A-21. 5-19-82 Escambia River Shaken Fate Screen, Model Fuel.

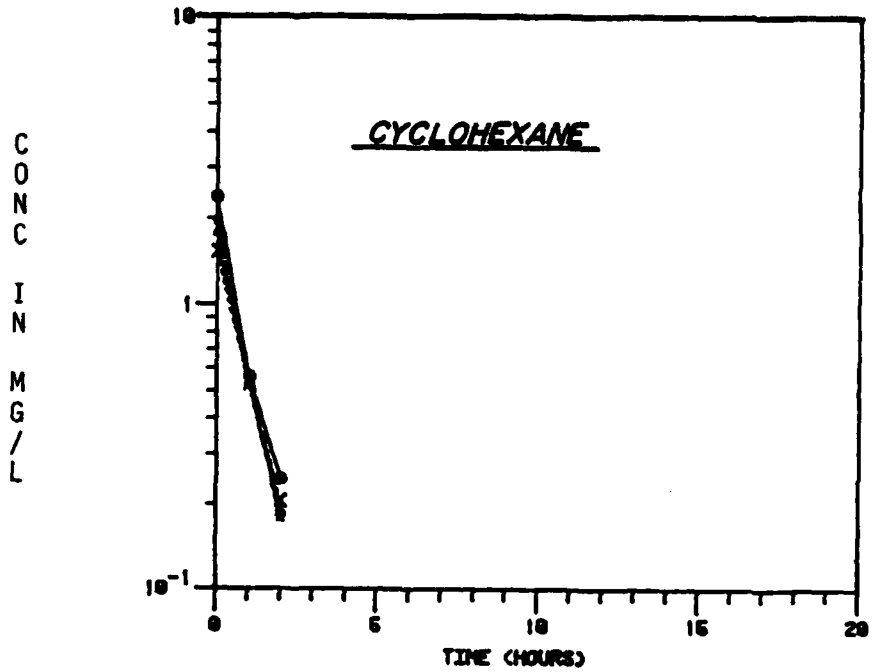


Figure A-22. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

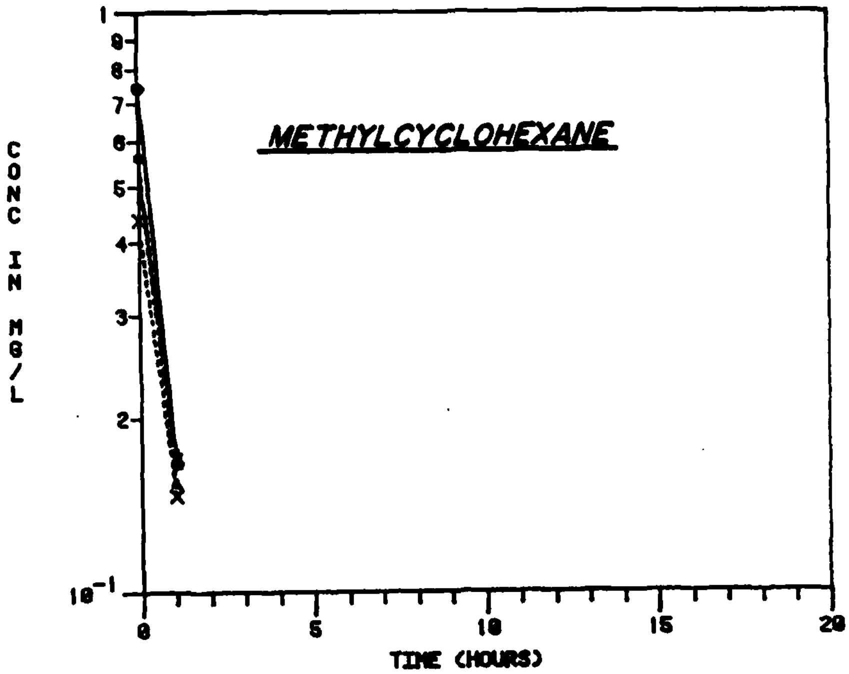


Figure A-23. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

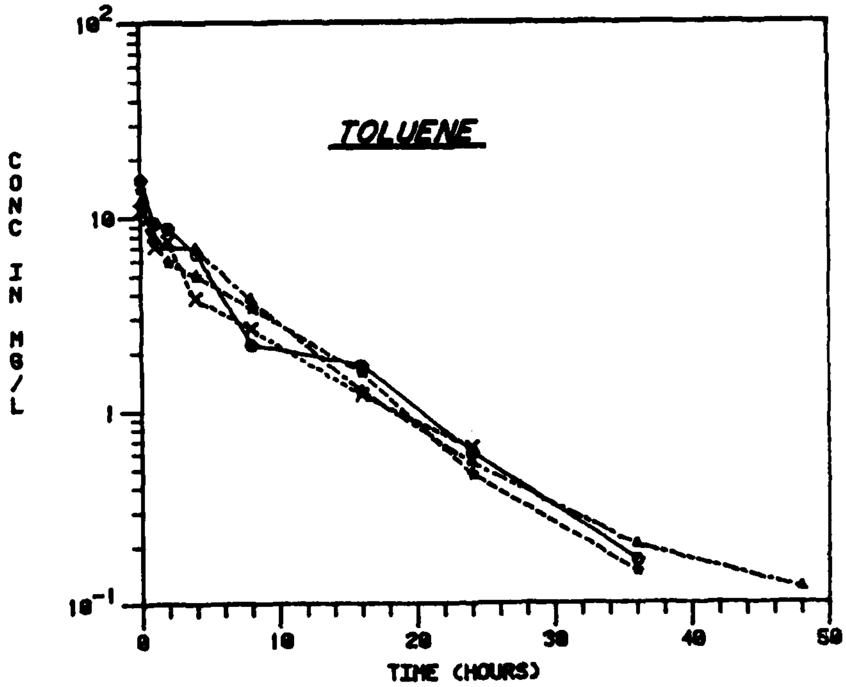


Figure A-24. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

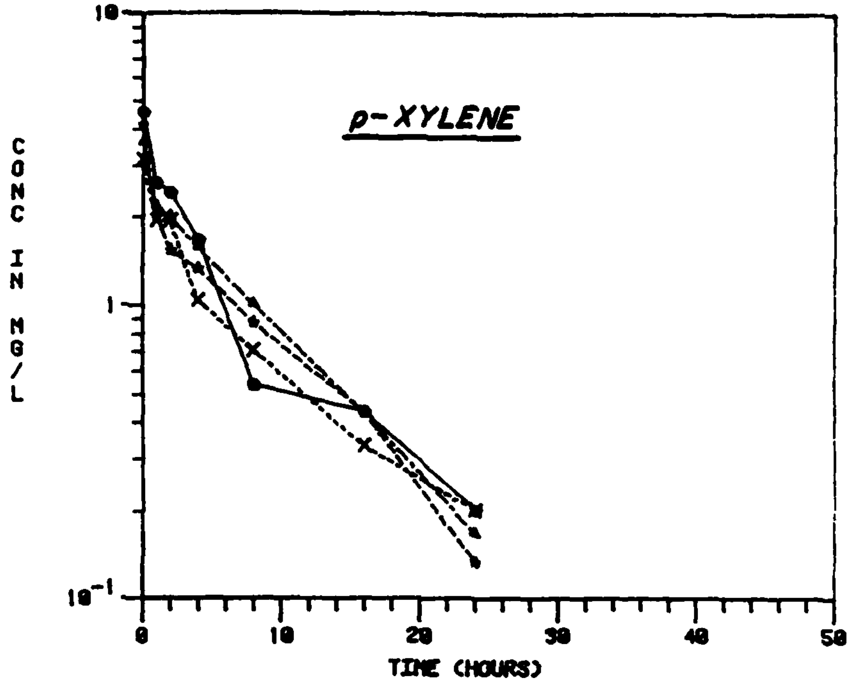


Figure A-25. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

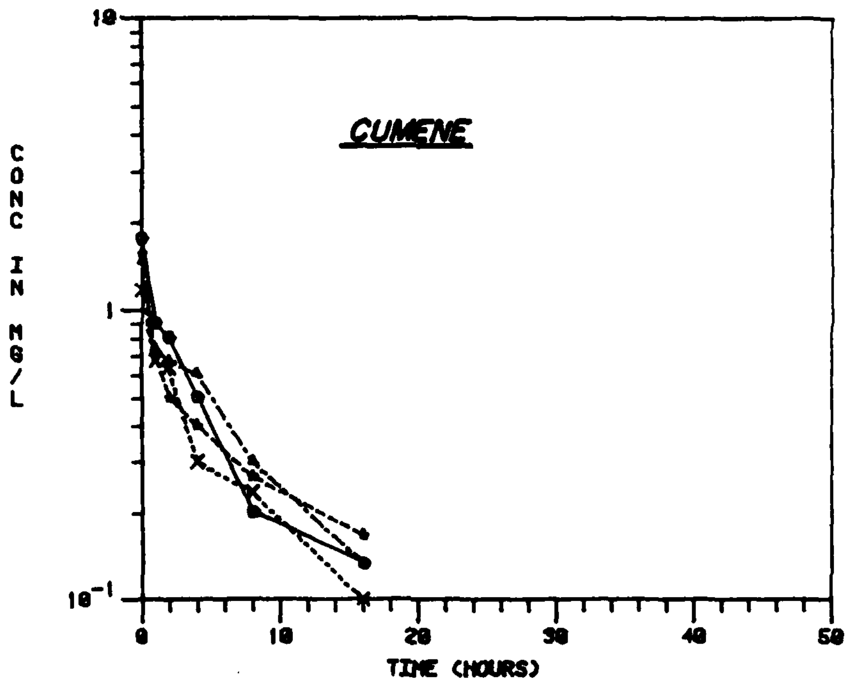


Figure A-26. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

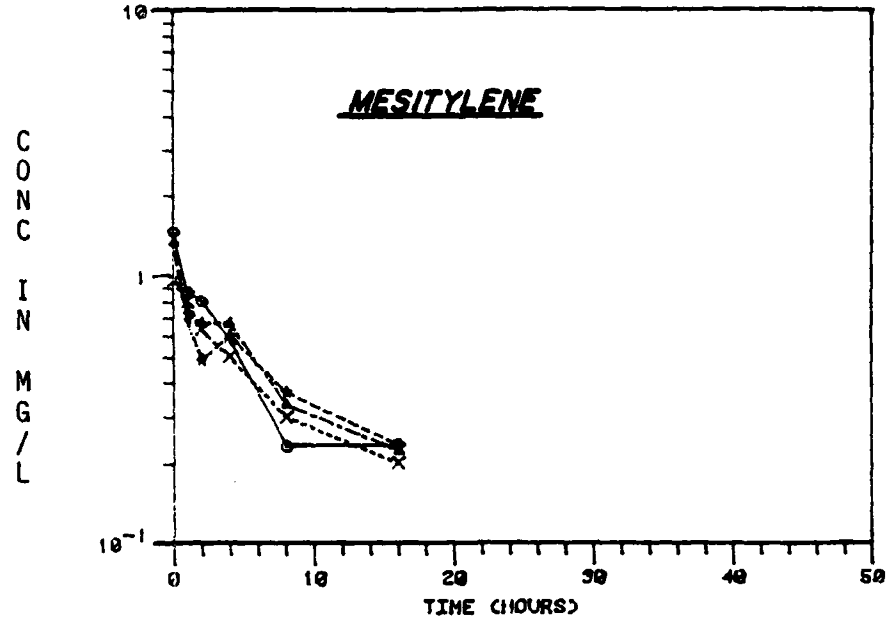


Figure A-27. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

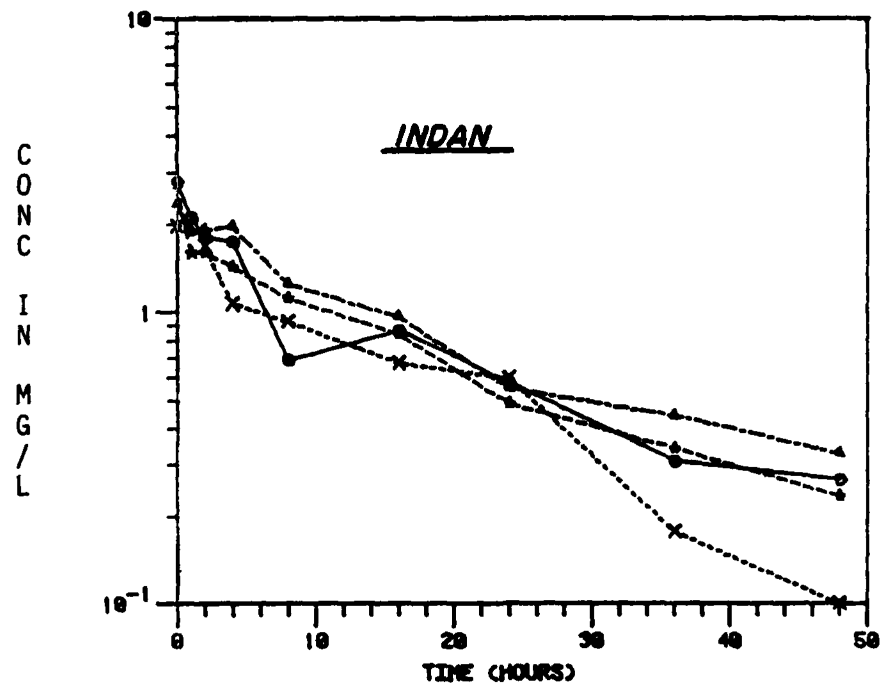


Figure A-28. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

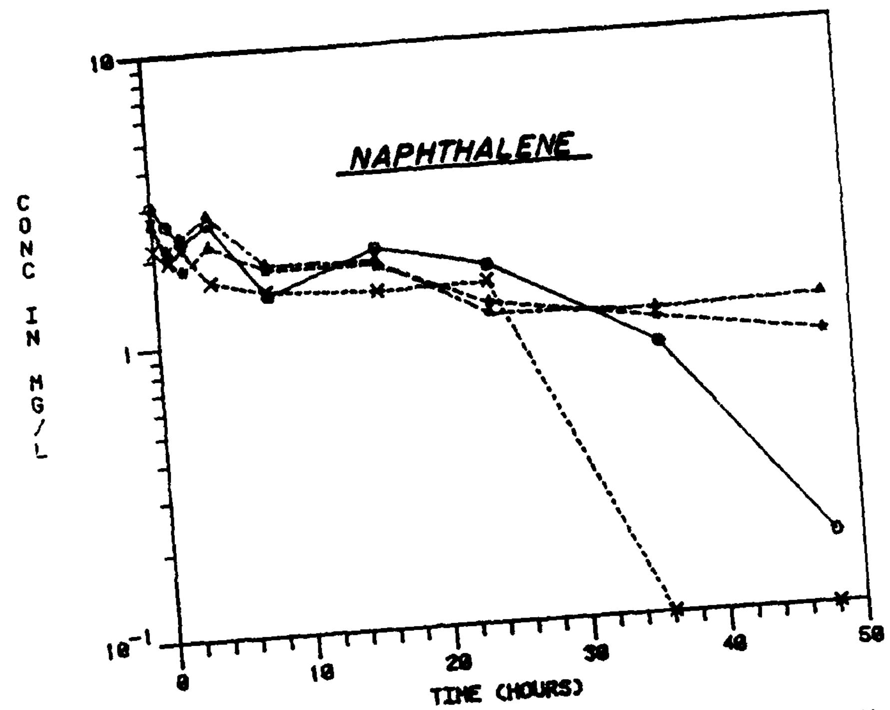


Figure A-29. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

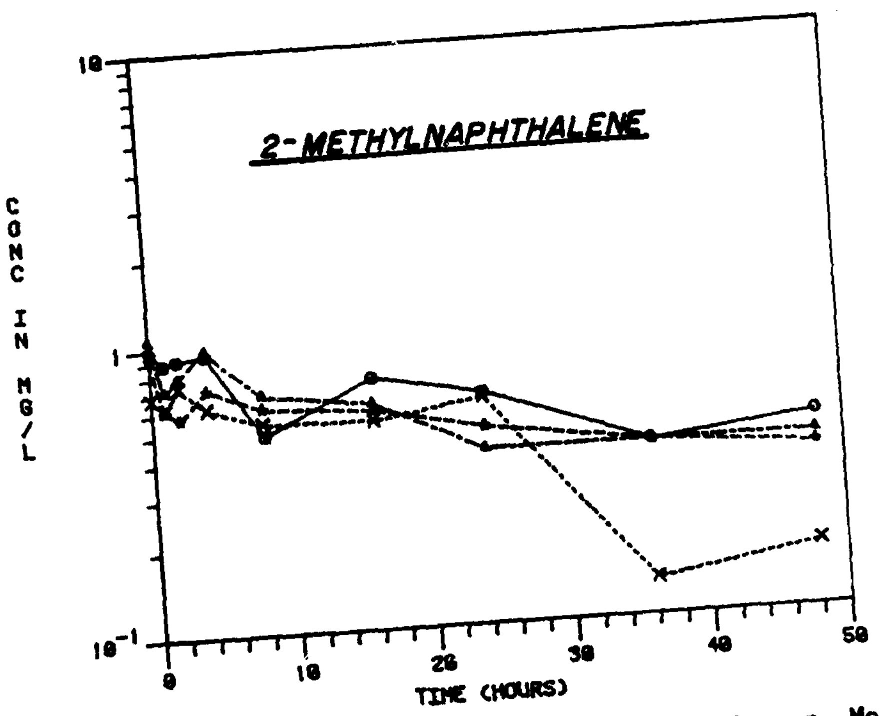


Figure A-30. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

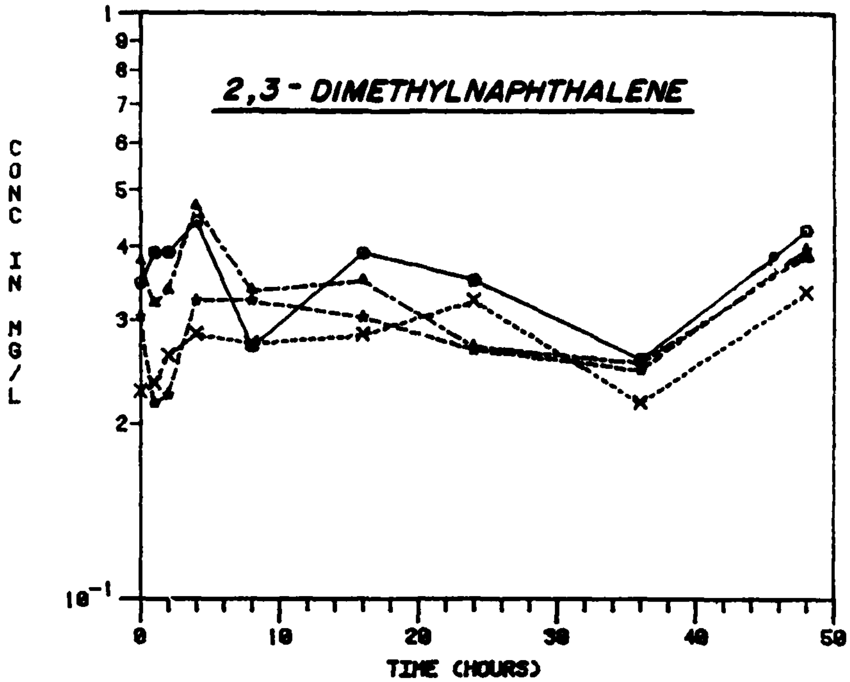


Figure A-31. 6-8-82 Bayou Chico Shaken Fate Screen, Model Fuel.

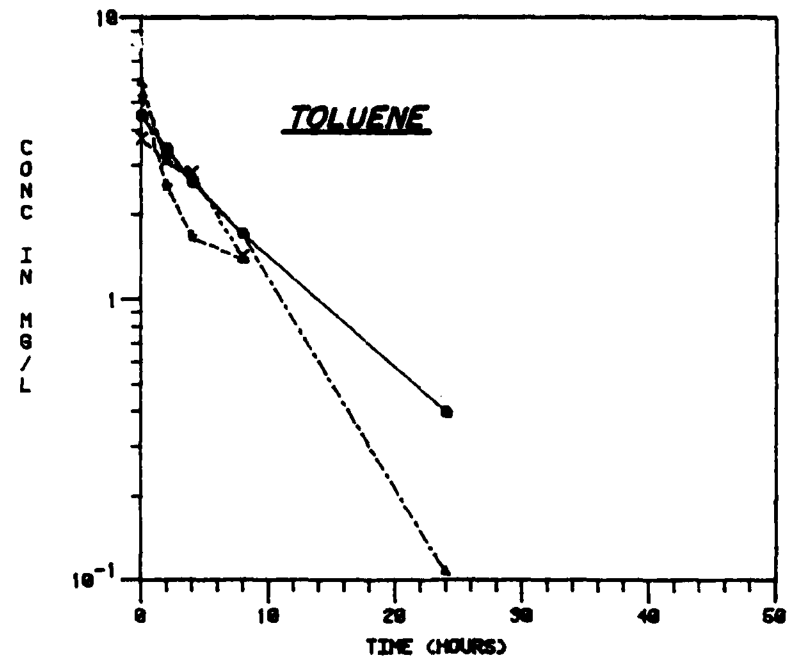
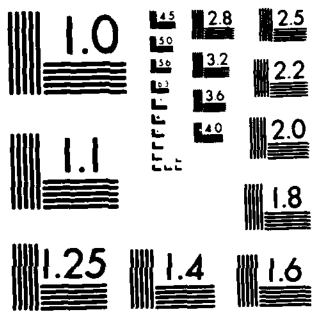


Figure A-32. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

AD-A139 791 DEGRADATION OF JET FUEL HYDROCARBONS BY AQUATIC MICROBIAL COMMUNITIES(U) AIR FORCE ENGINEERING AND SERVICES CENTER TYDALL AFB FL ENGIN.. J C SPAIN ET AL. 2/3

UNCLASSIFIED NOV 83 AFESC/ESL-TR-83-26 F/G 21/4 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

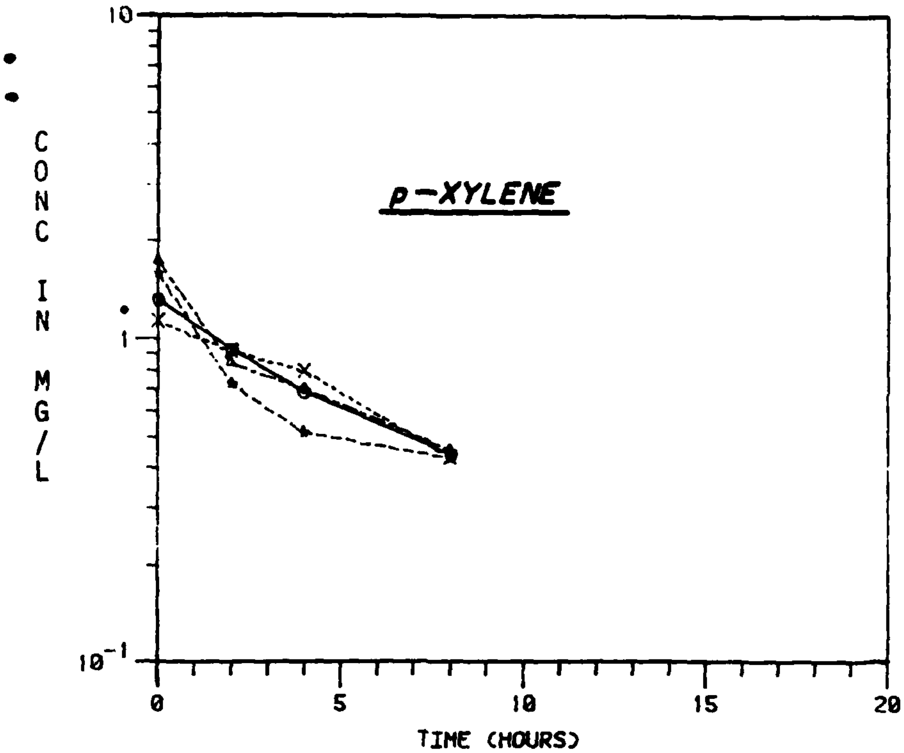


Figure A-33. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

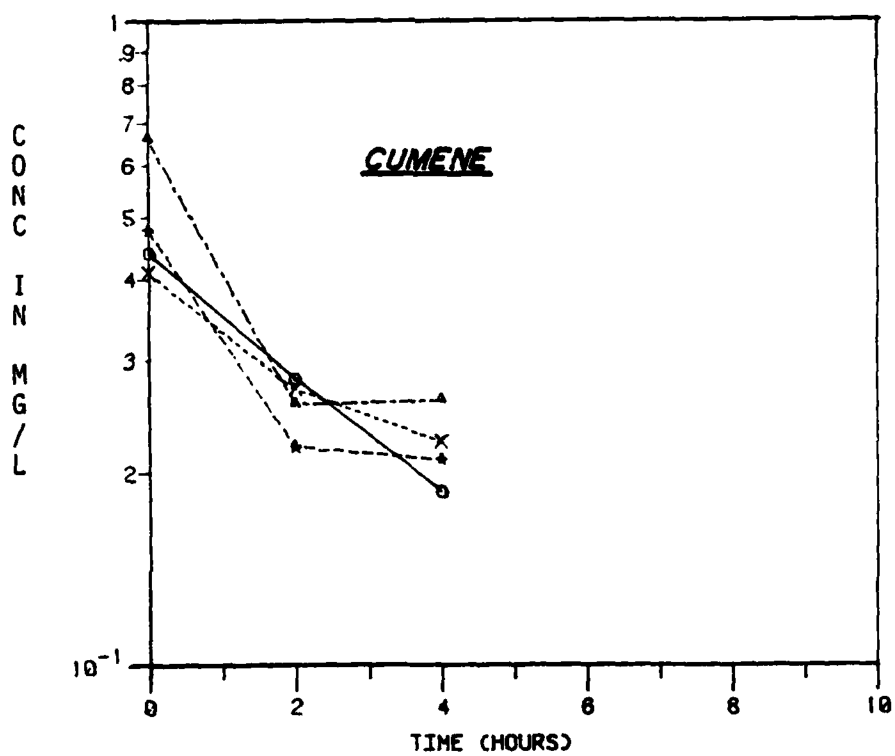


Figure A-34. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

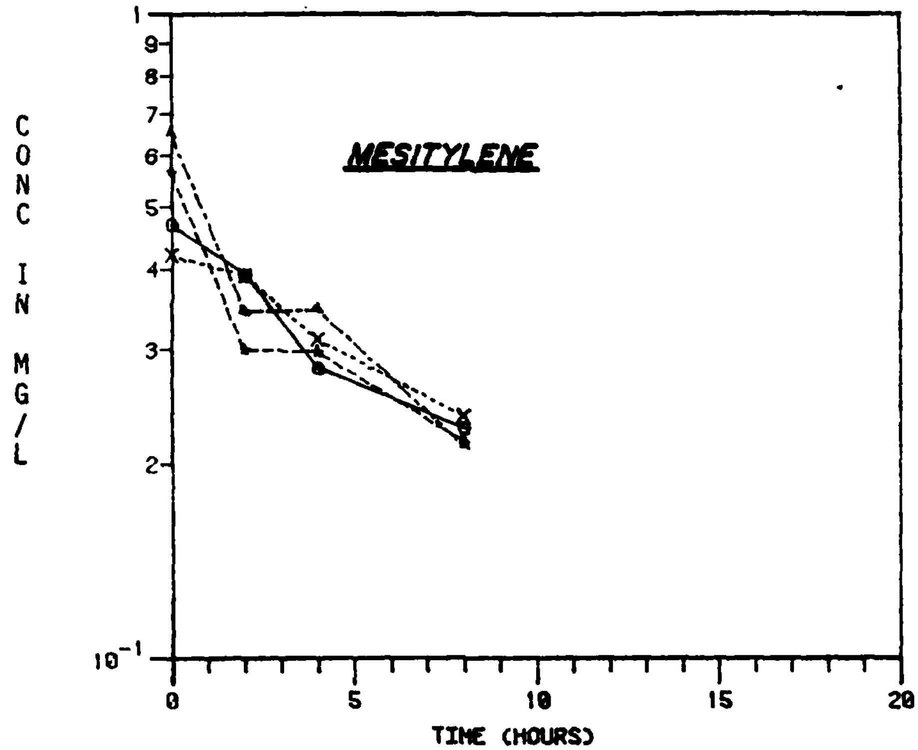


Figure A-35. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

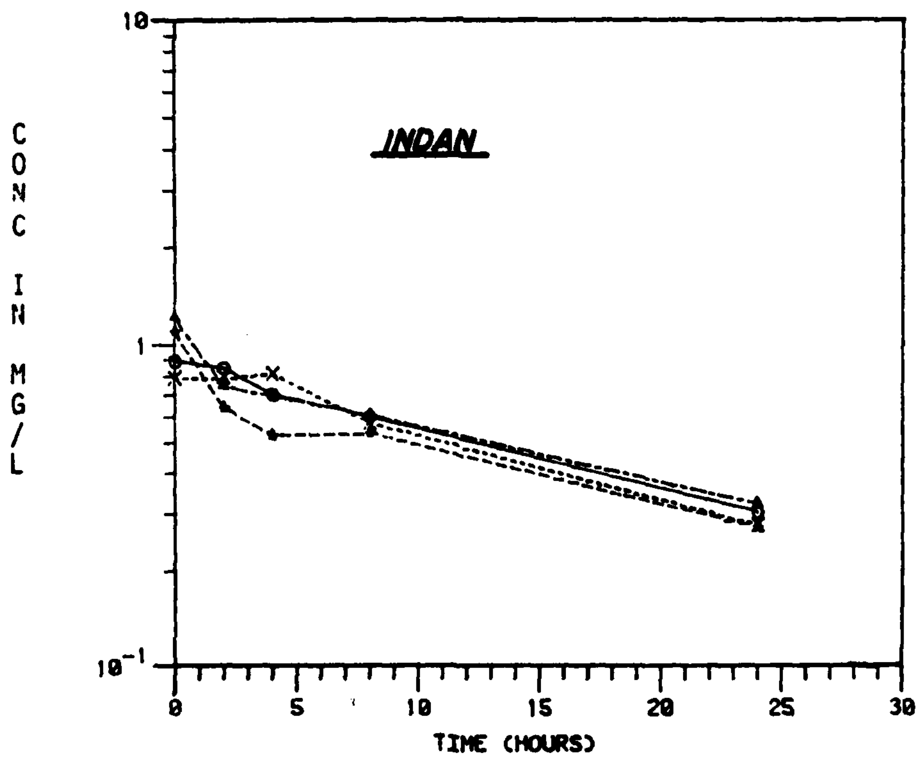


Figure A-36. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

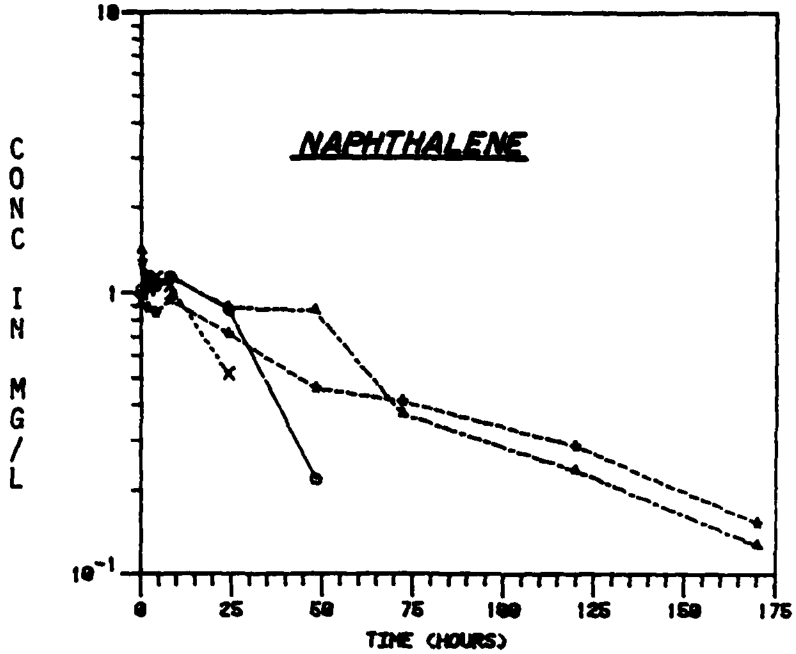


Figure A-37. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

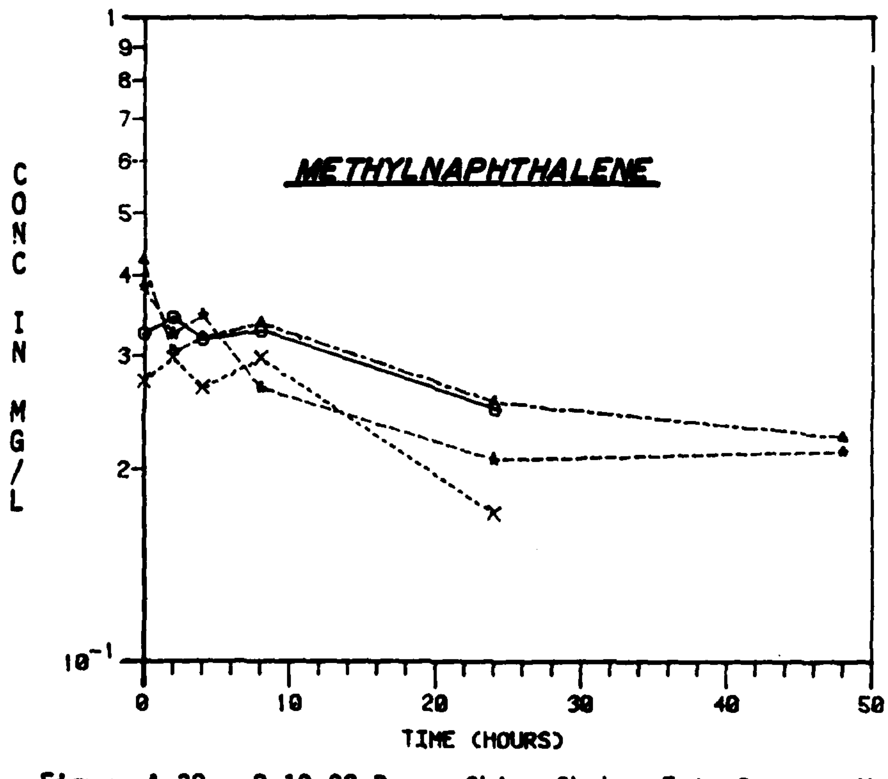


Figure A-38. 8-10-82 Bayou Chico Shaken Fate Screen, Model Fuel.

APPENDIX B

MODEL FUEL - QUIESCENT TESTS

5-19-82 to 8-18-82

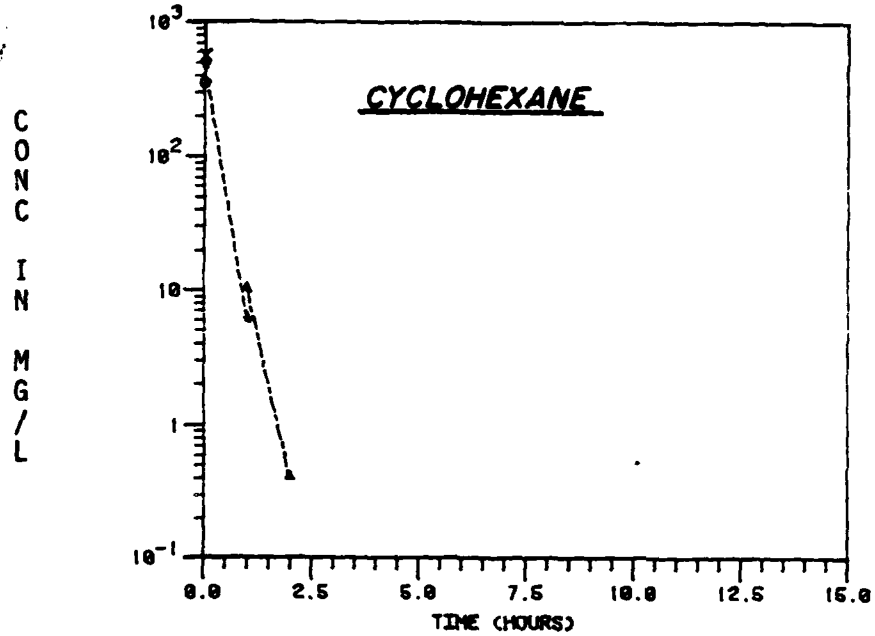


Figure B-1. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

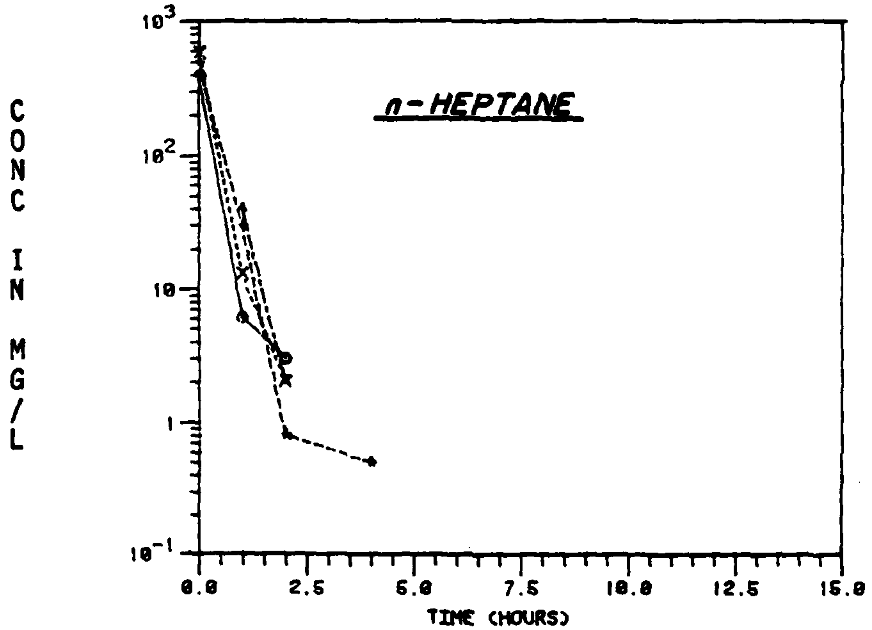


Figure B-2. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

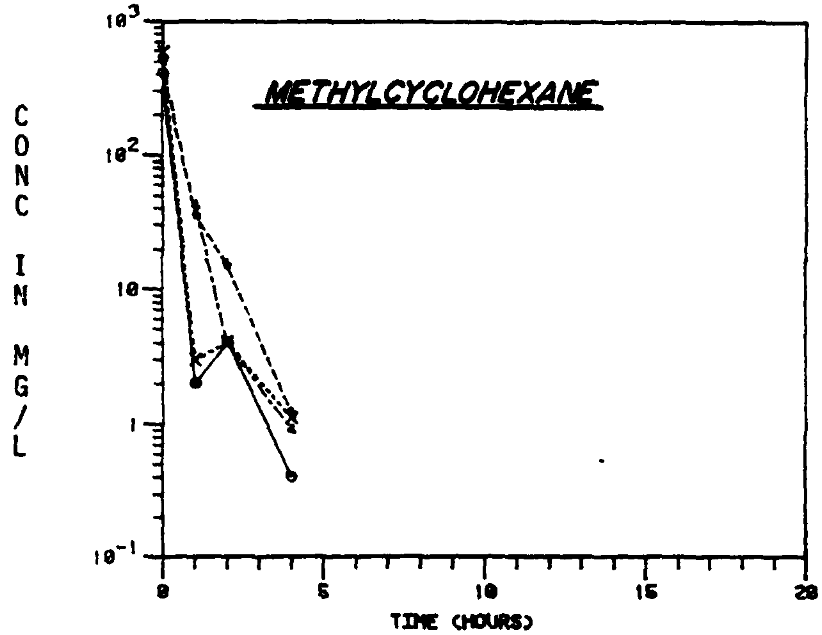


Figure B-3. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

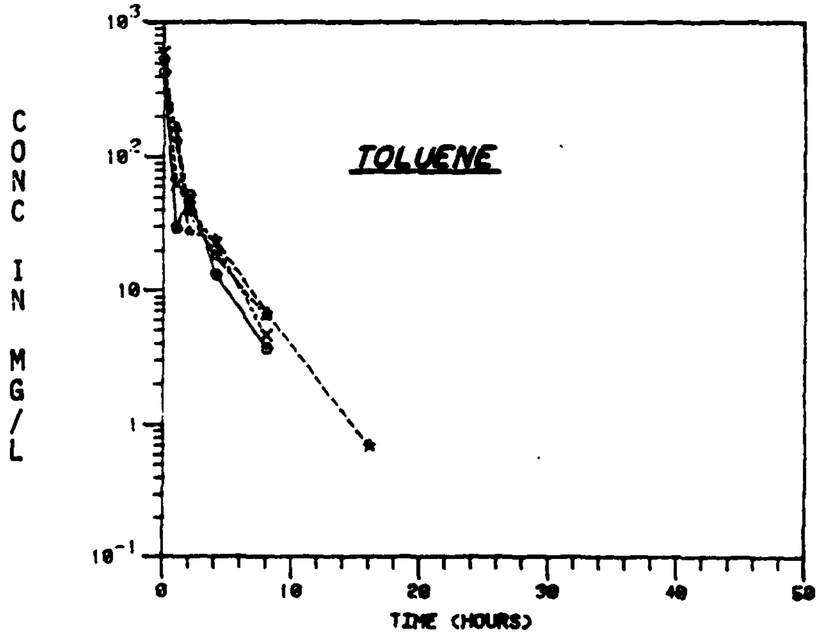


Figure B-4. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

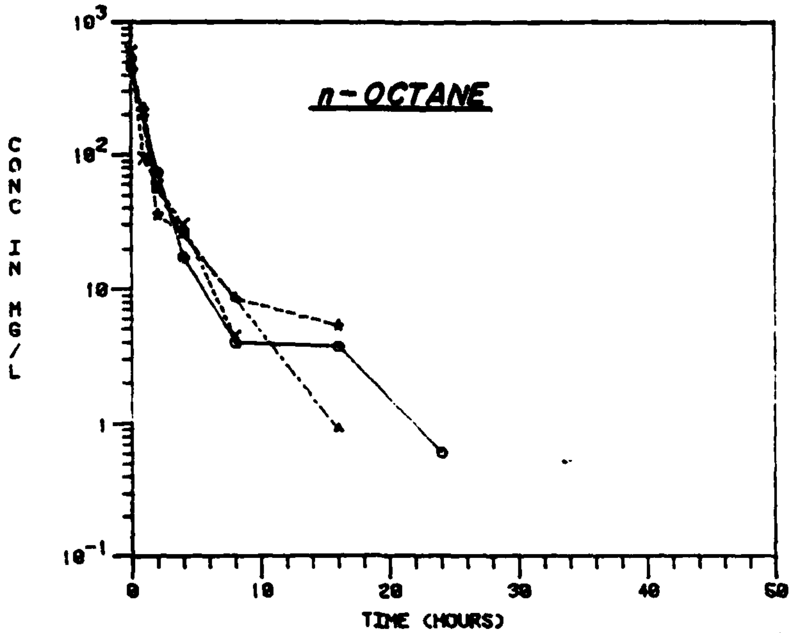


Figure B-5. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

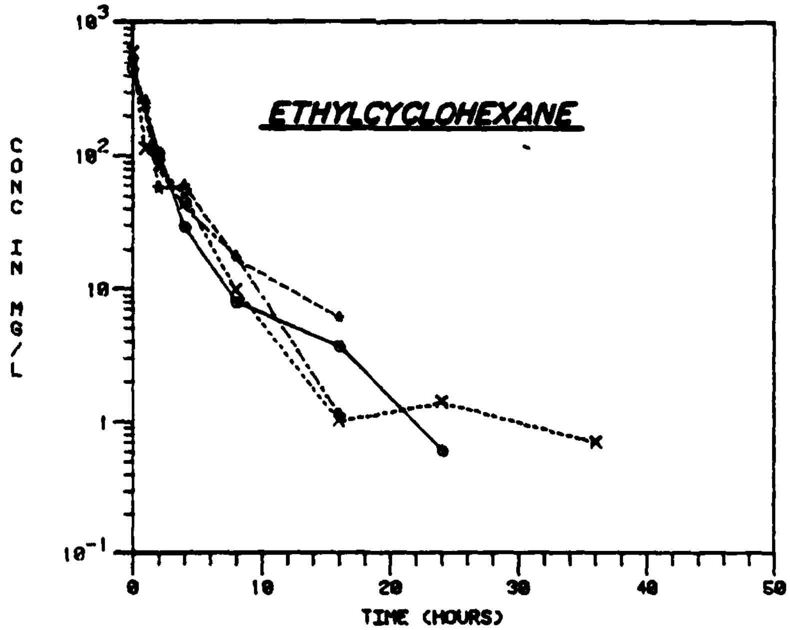


Figure B-6. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

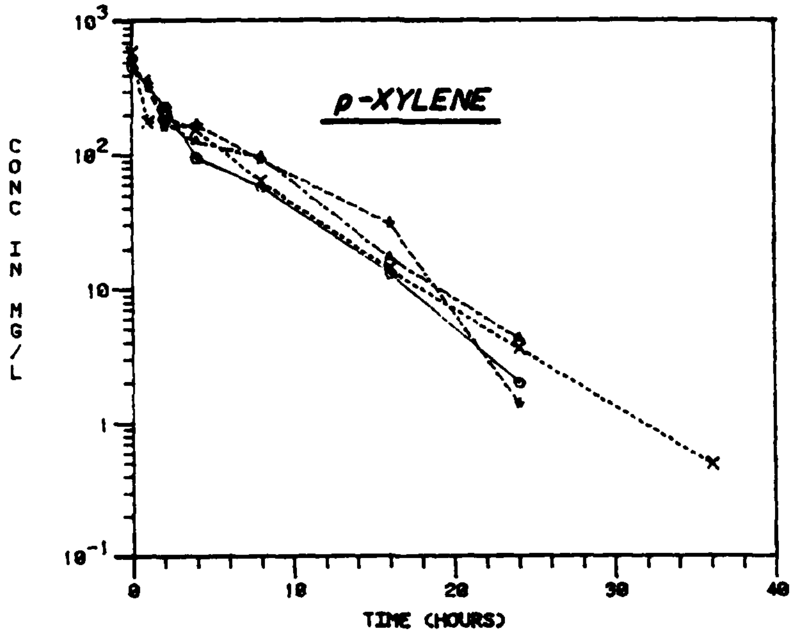


Figure B-7. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

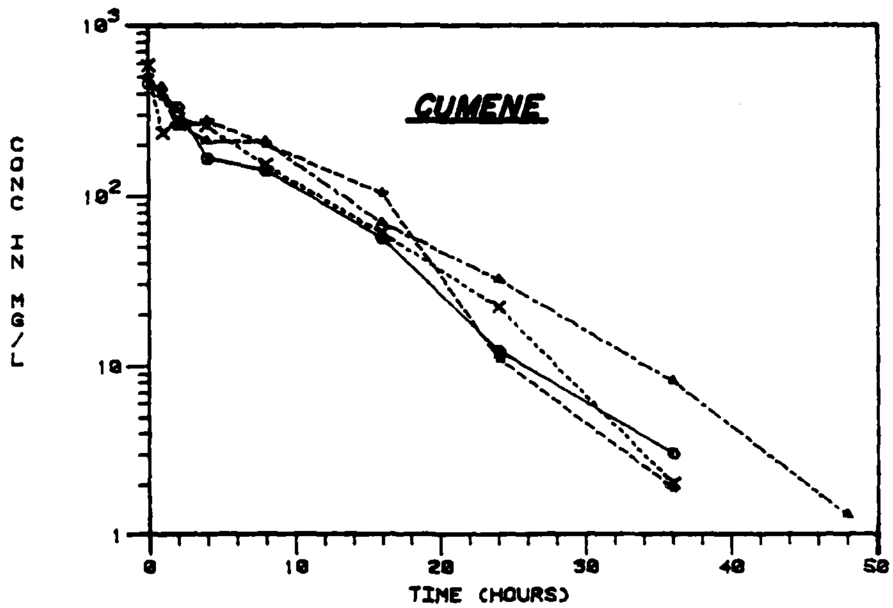


Figure B-8. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

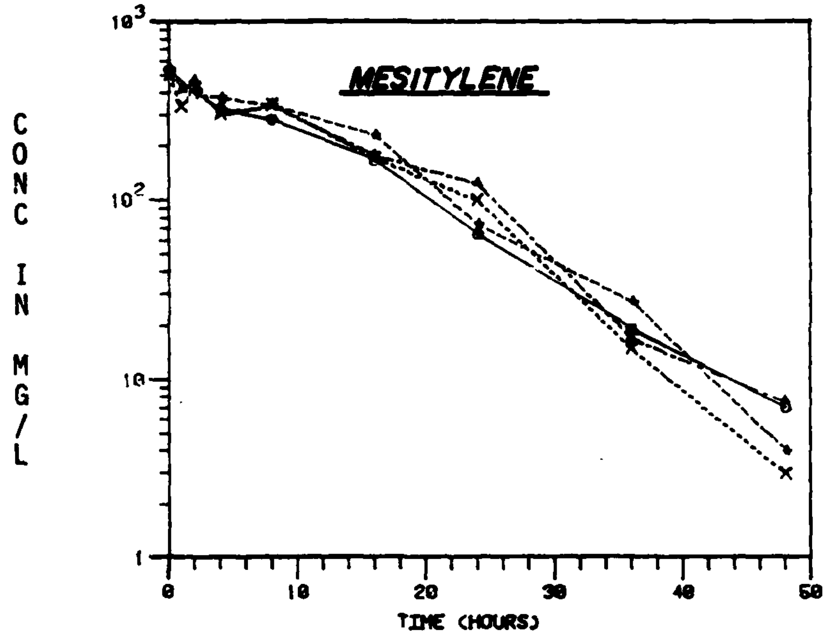


Figure B-9. Escambia River Quiescent Fate Screen, Model Fuel

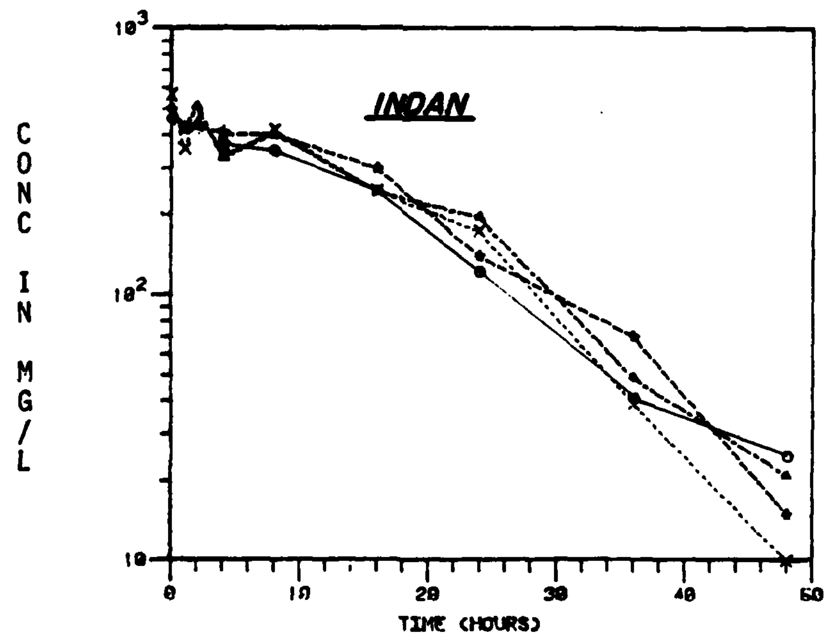


Figure B-10. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

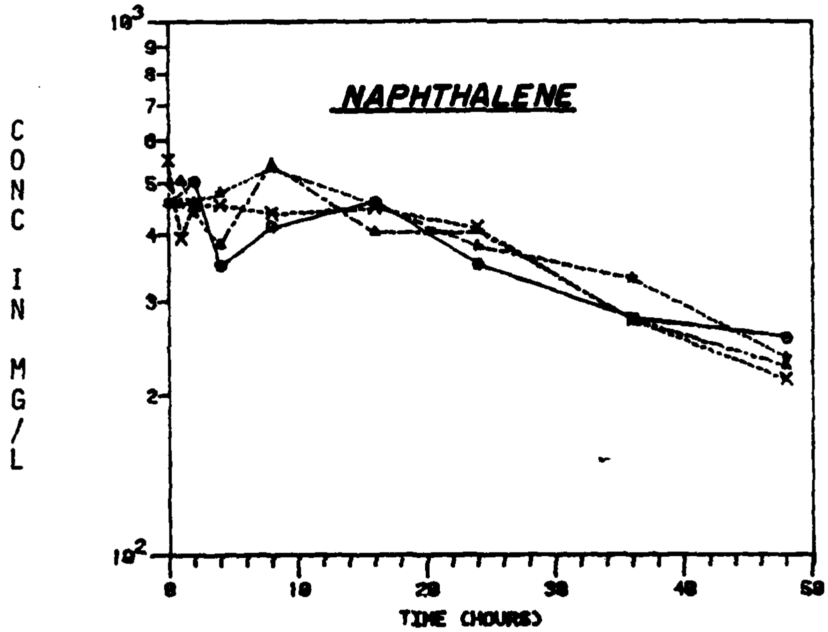


Figure B-11. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

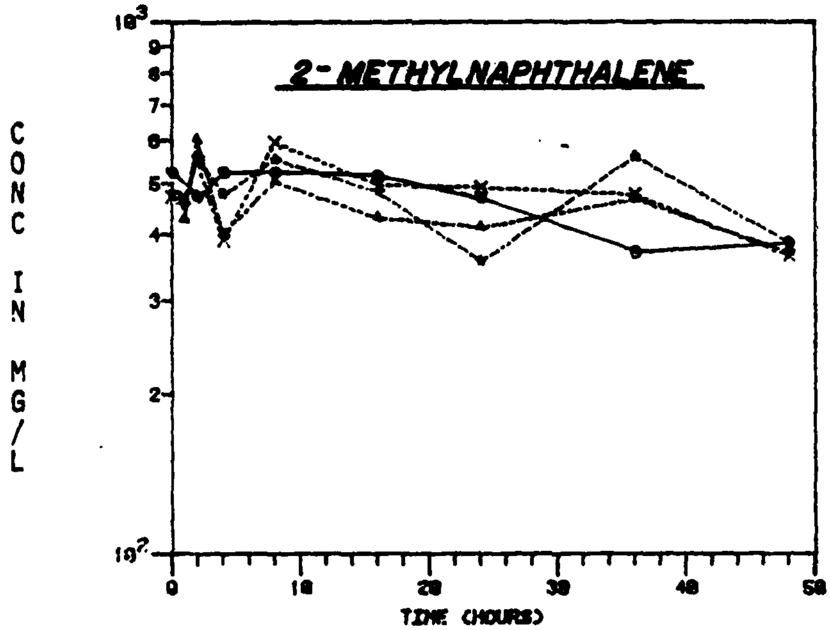


Figure B-12. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

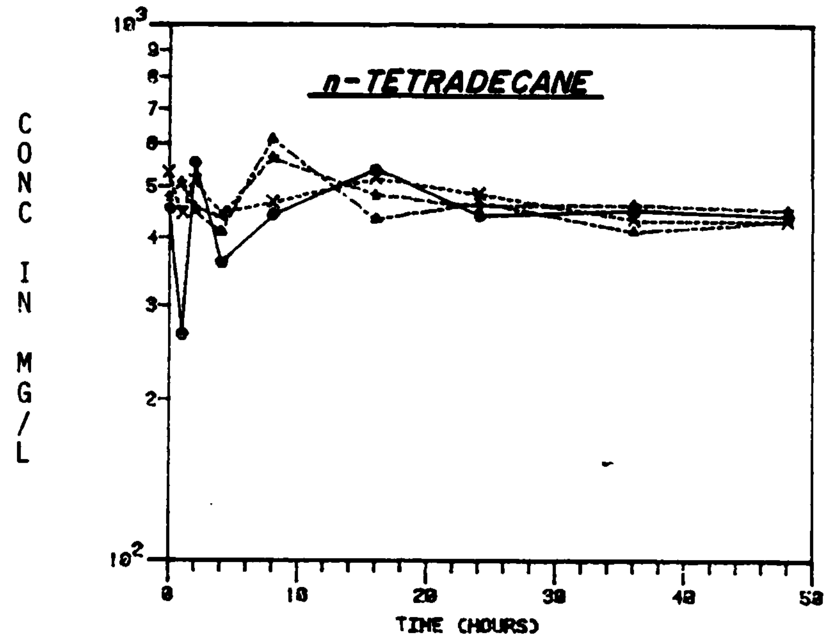


Figure B-13. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

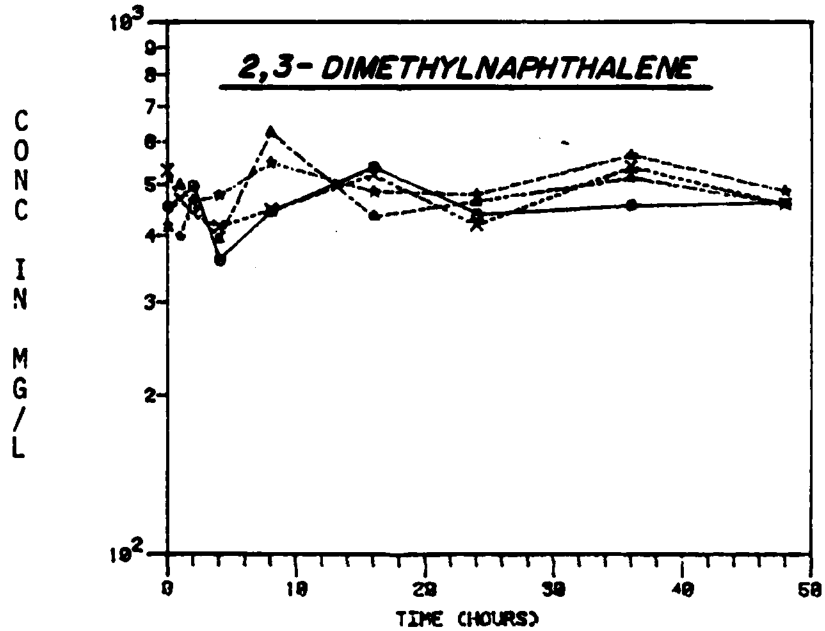


Figure B-14. 5-19-82 Escambia River Quiescent Fate Screen, Model Fuel

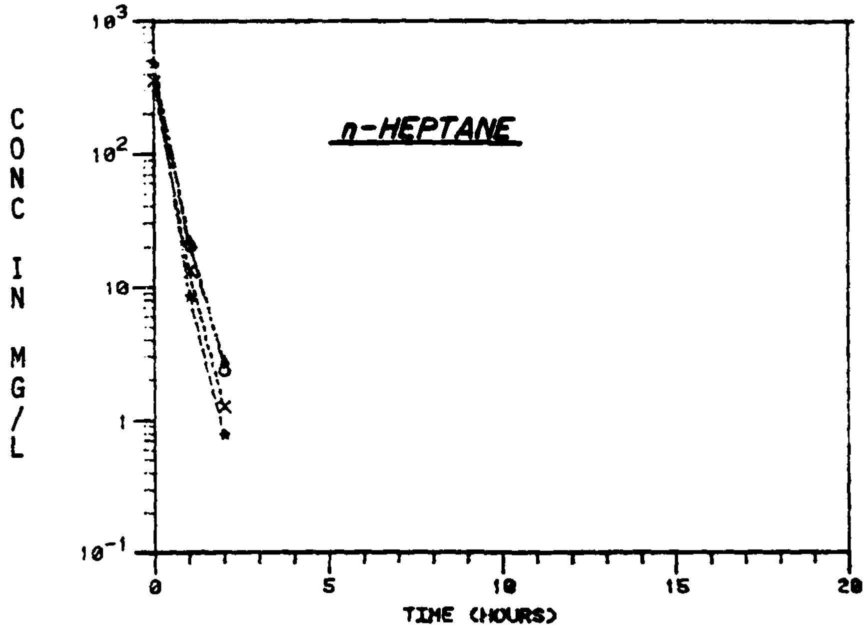


Figure B-15. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

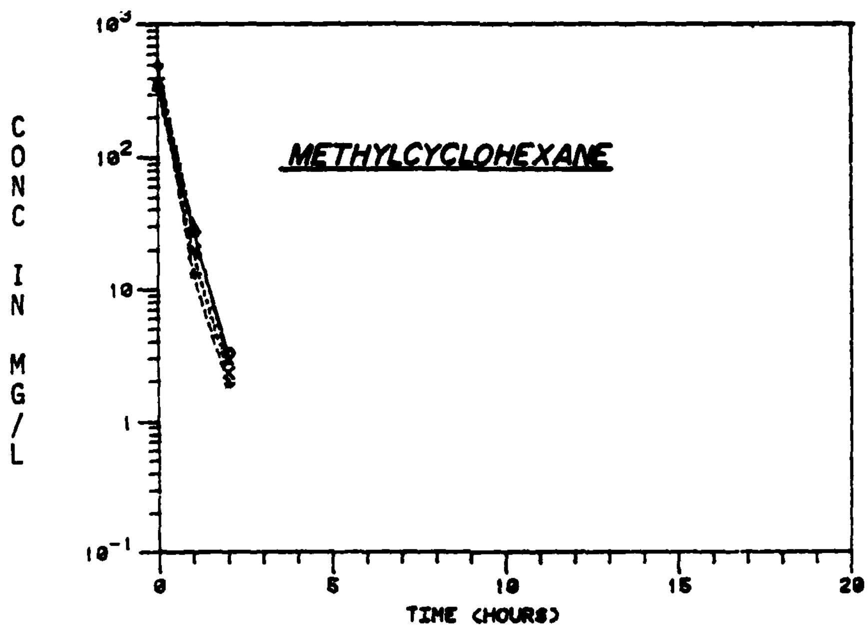


Figure B-16. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

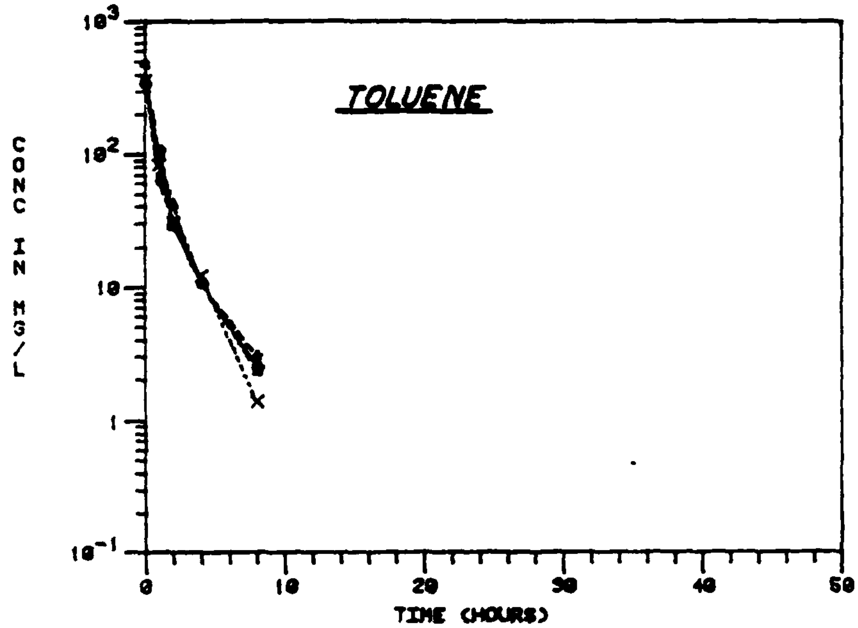


Figure B-17. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

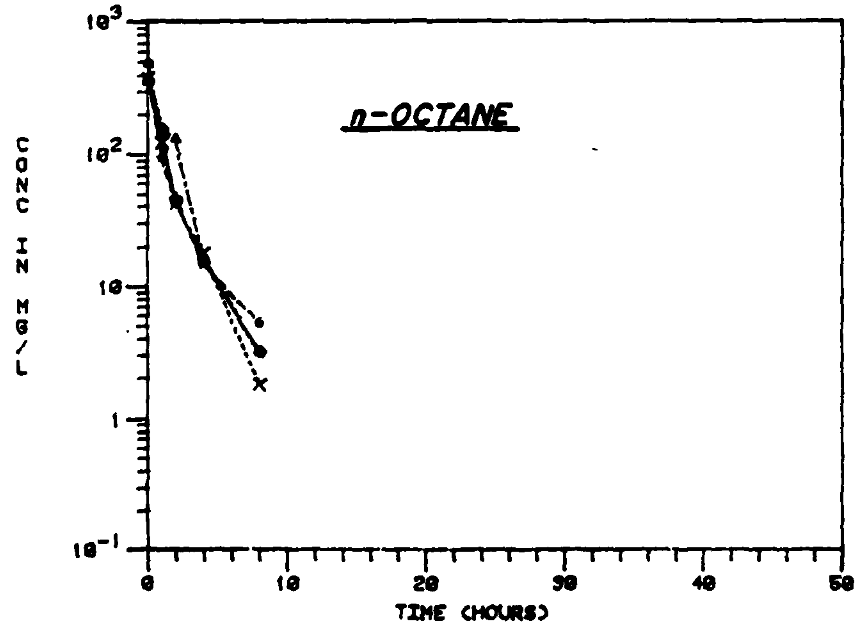


Figure B-18. 6-3-82 Bayou Chico Quiescent Fate Screen, Model Fuel

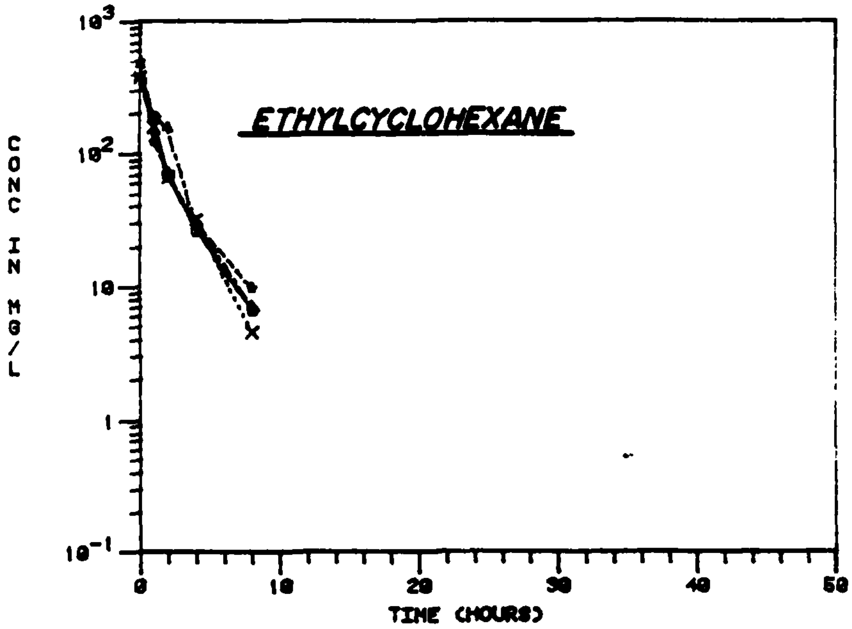


Figure B-19. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

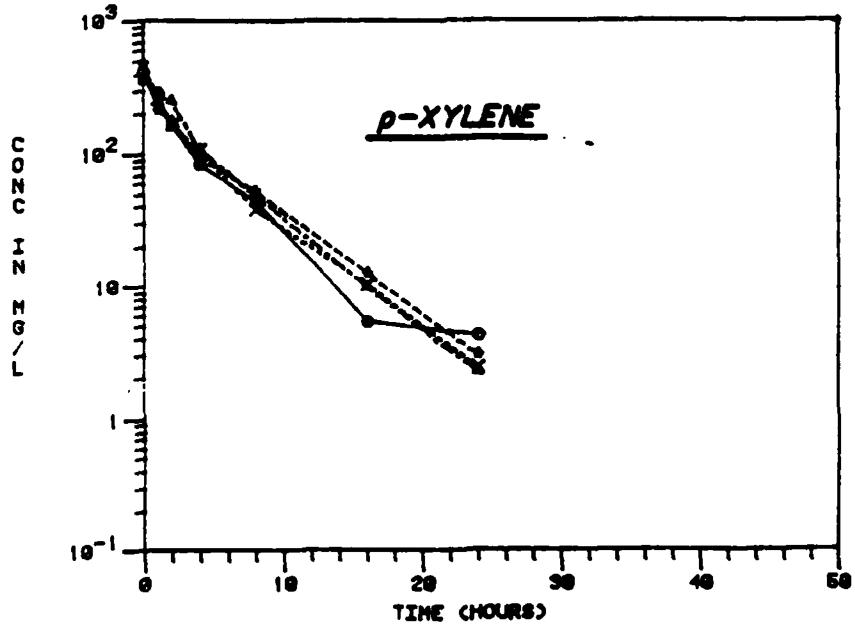


Figure B-20. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

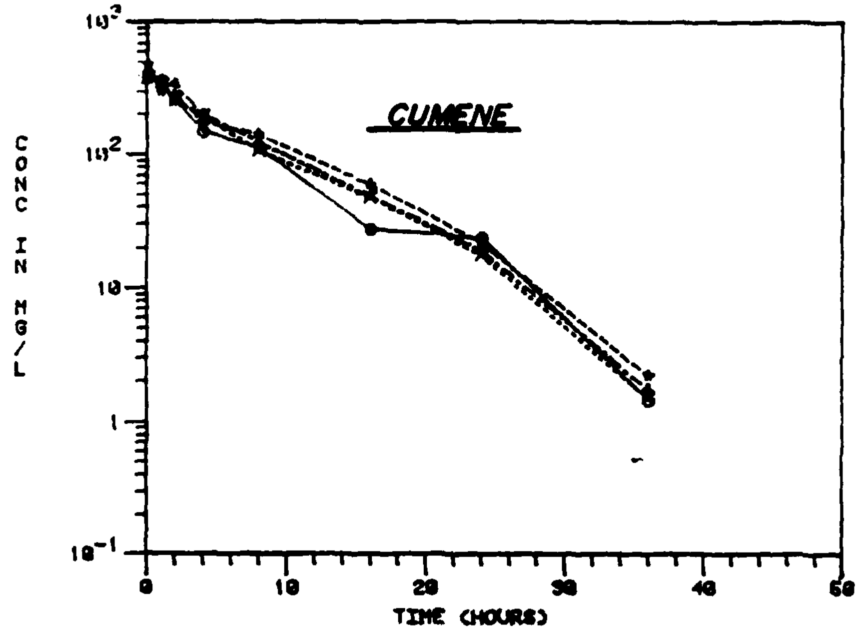


Figure B-21. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

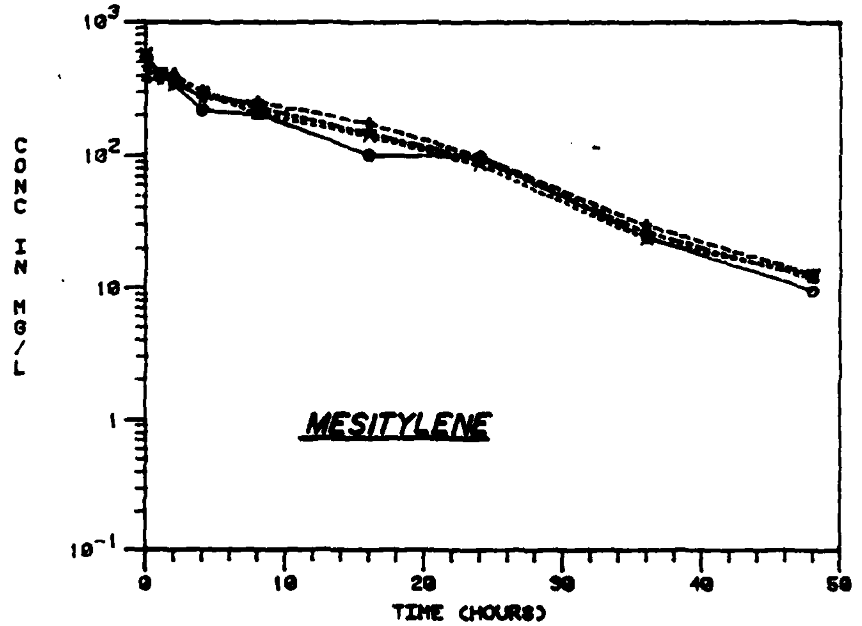


Figure B-22. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

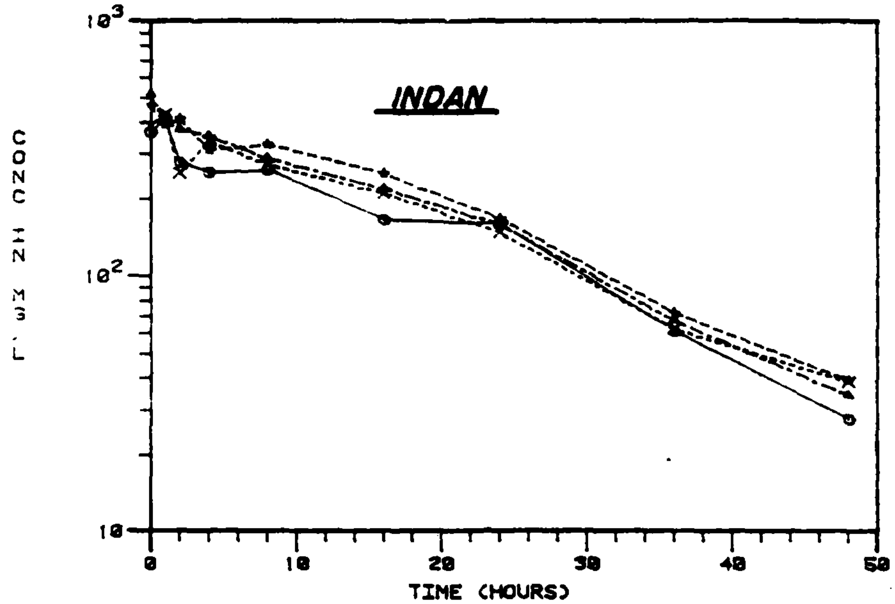


Figure B-23. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

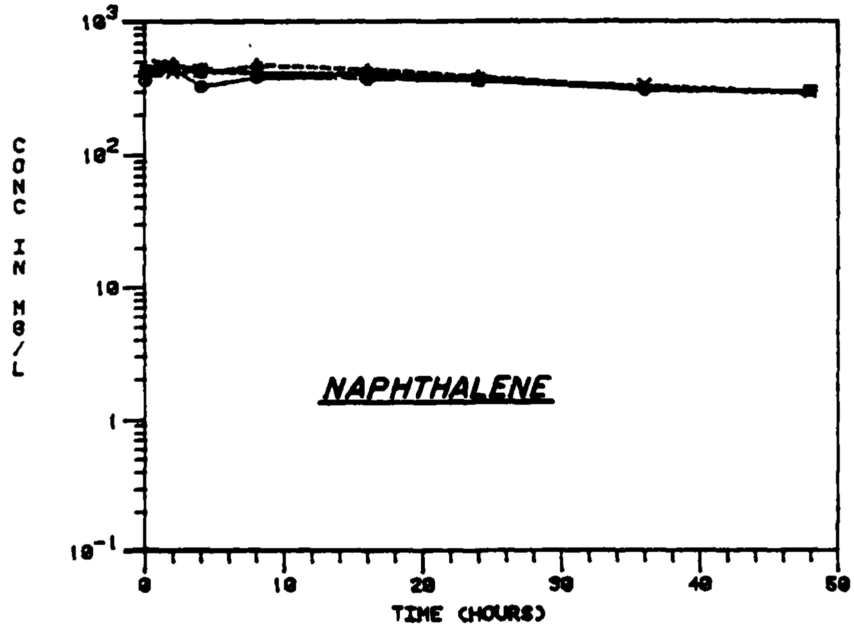


Figure B-24. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

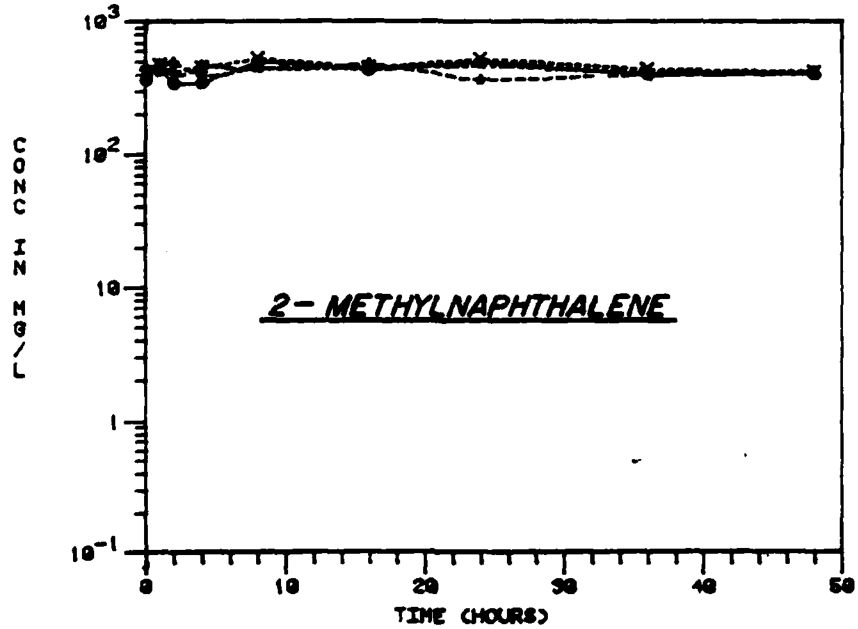


Figure B-25. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

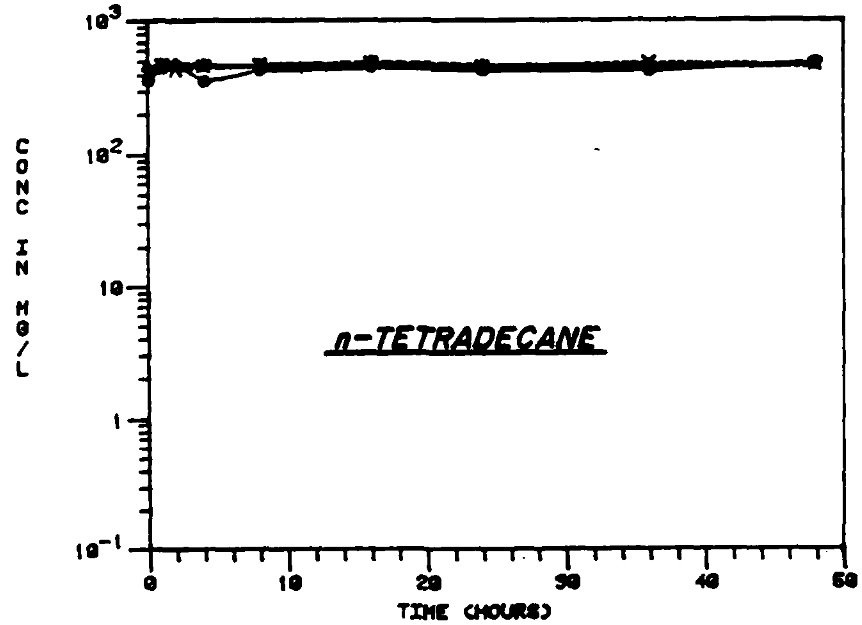


Figure B-26. 6-8-82 Bayou Chico Quiescent Fate Screen, Model Fuel

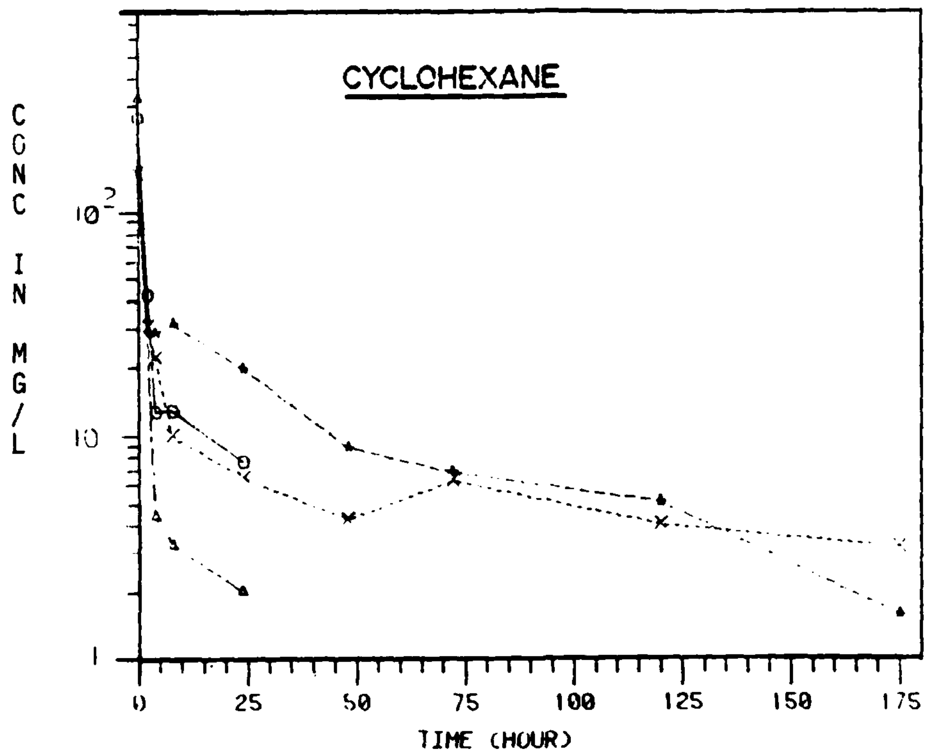


Figure B-27. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

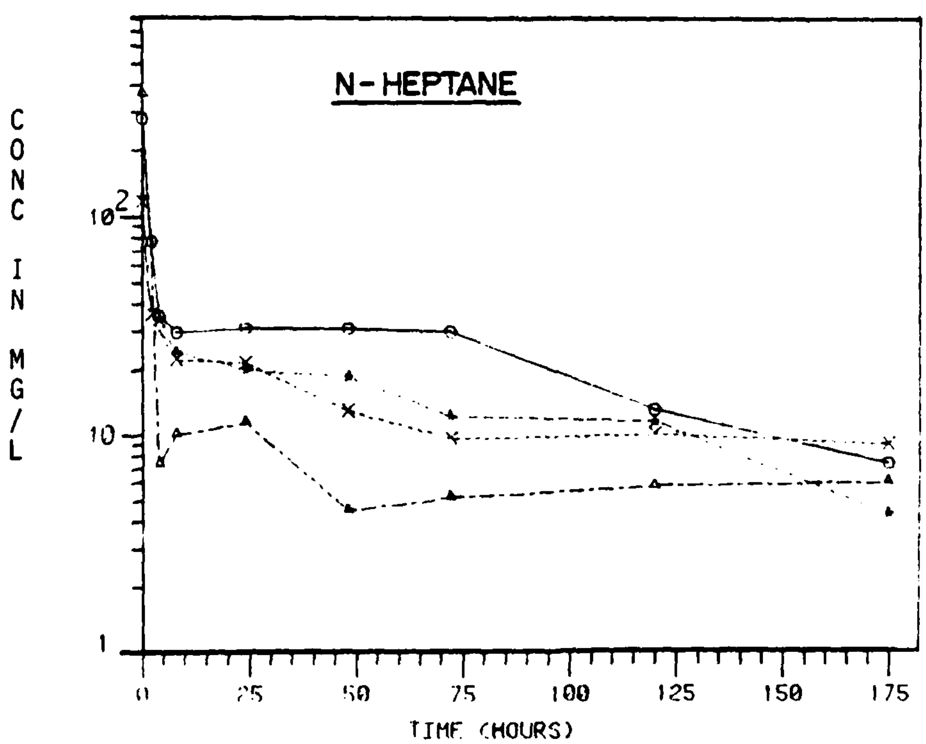


Figure B-28. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

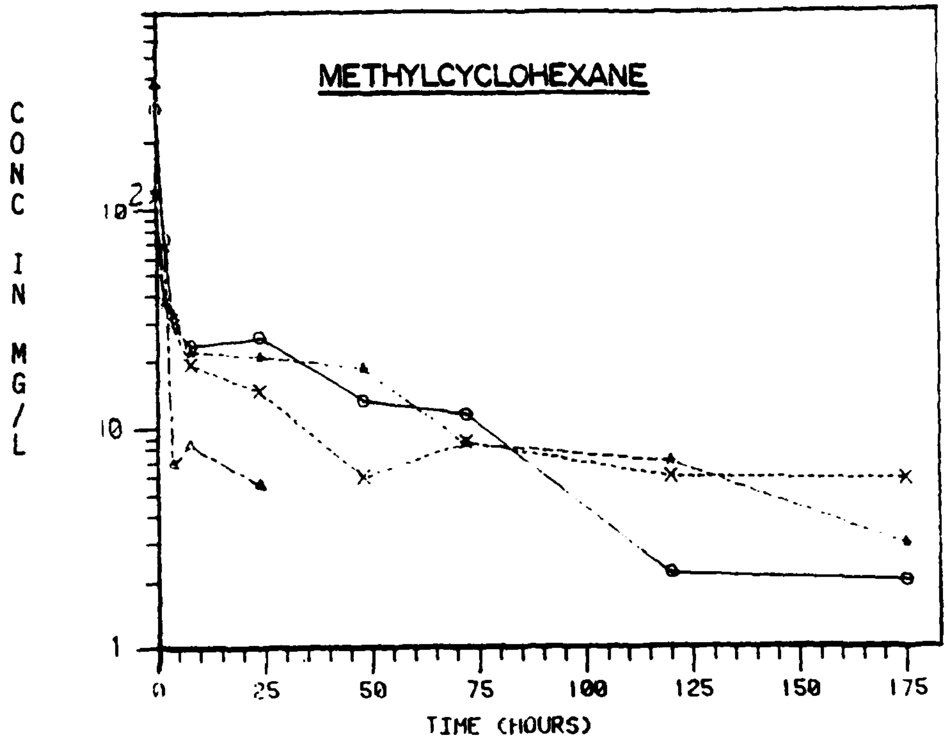


Figure B-29. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

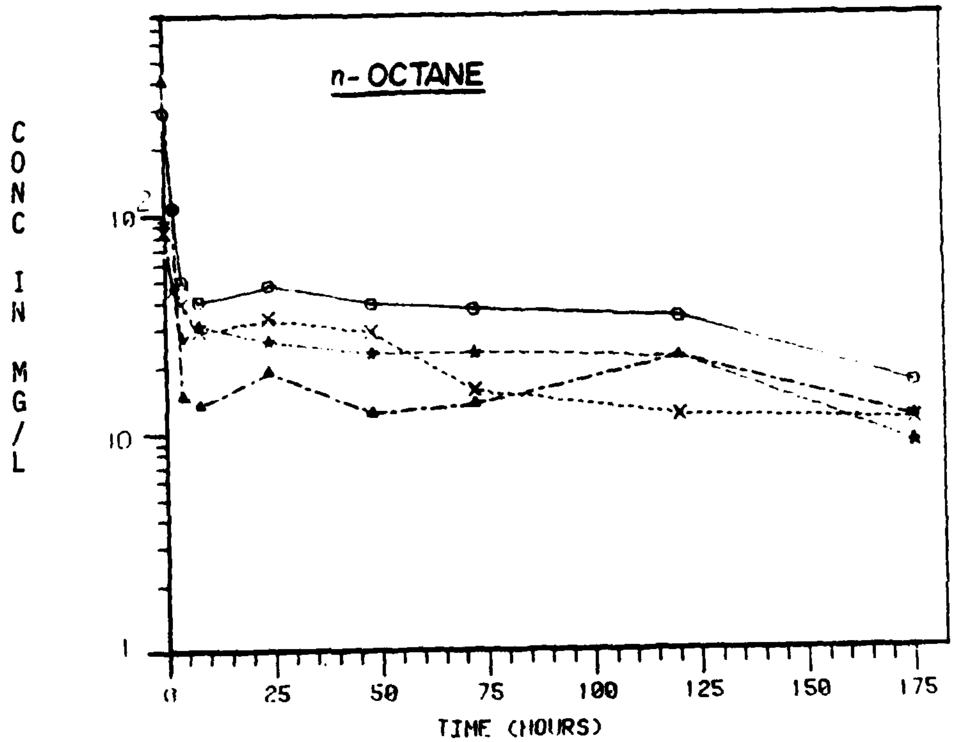


Figure B-30. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

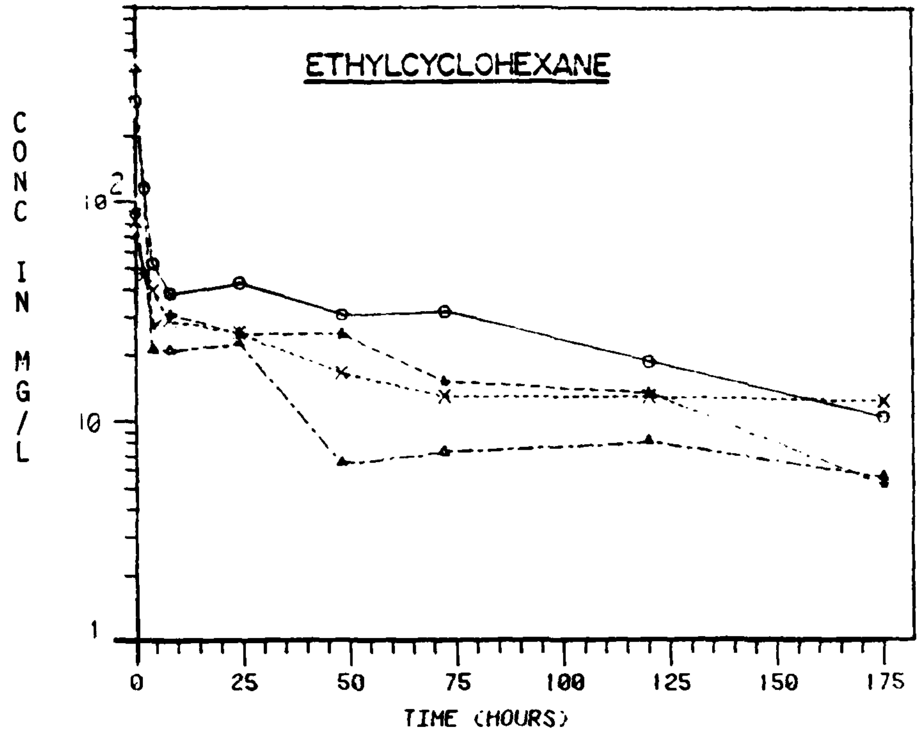


Figure B-31. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

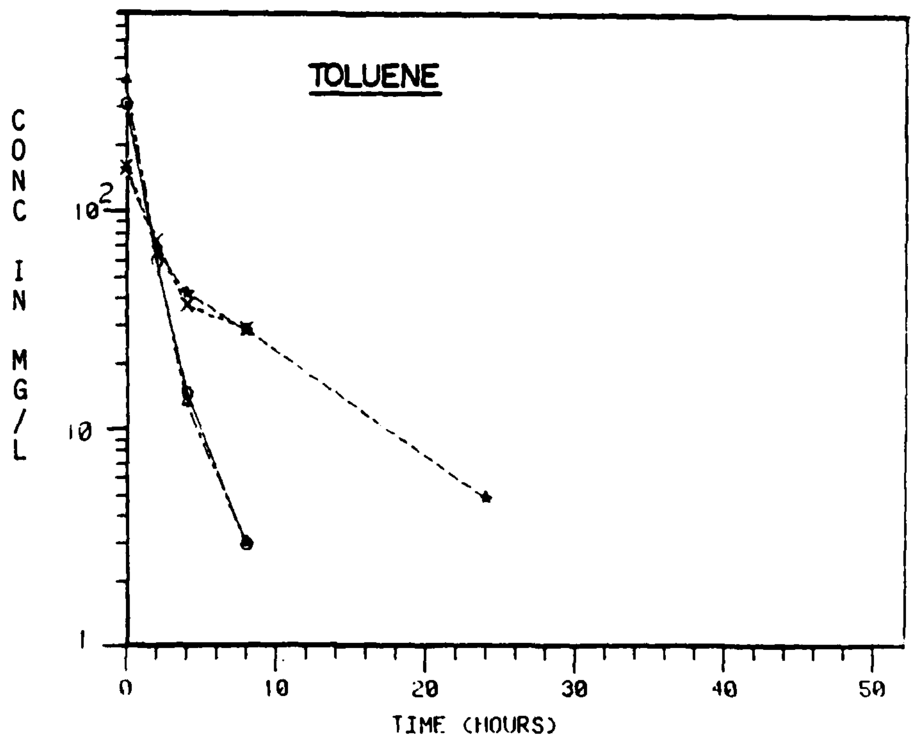


Figure B-32. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

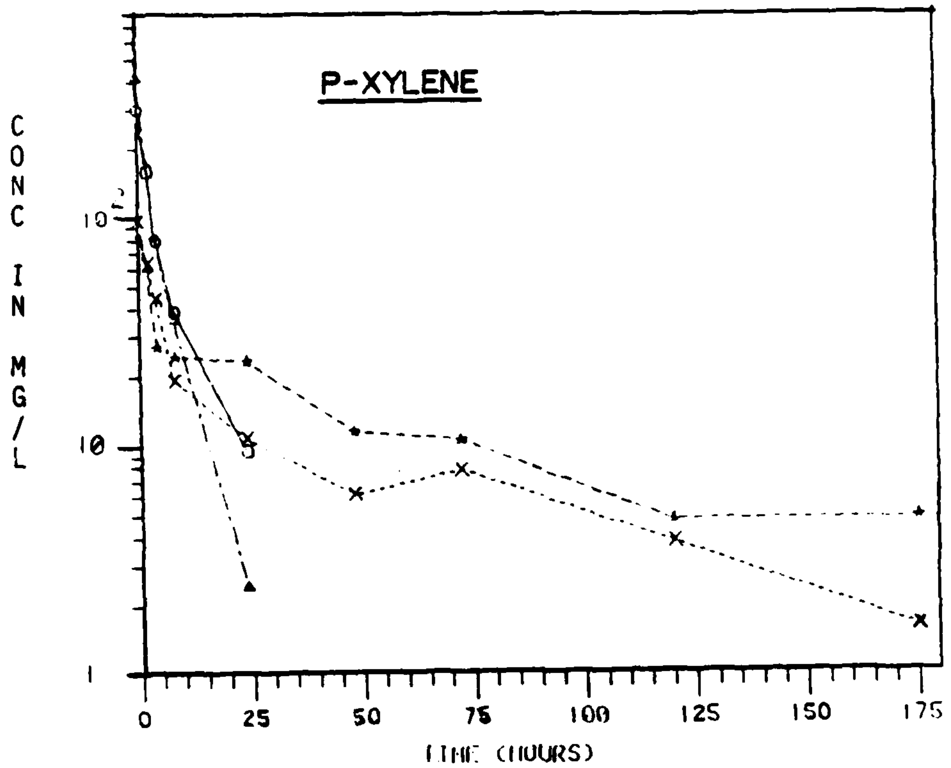


Figure B-33. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

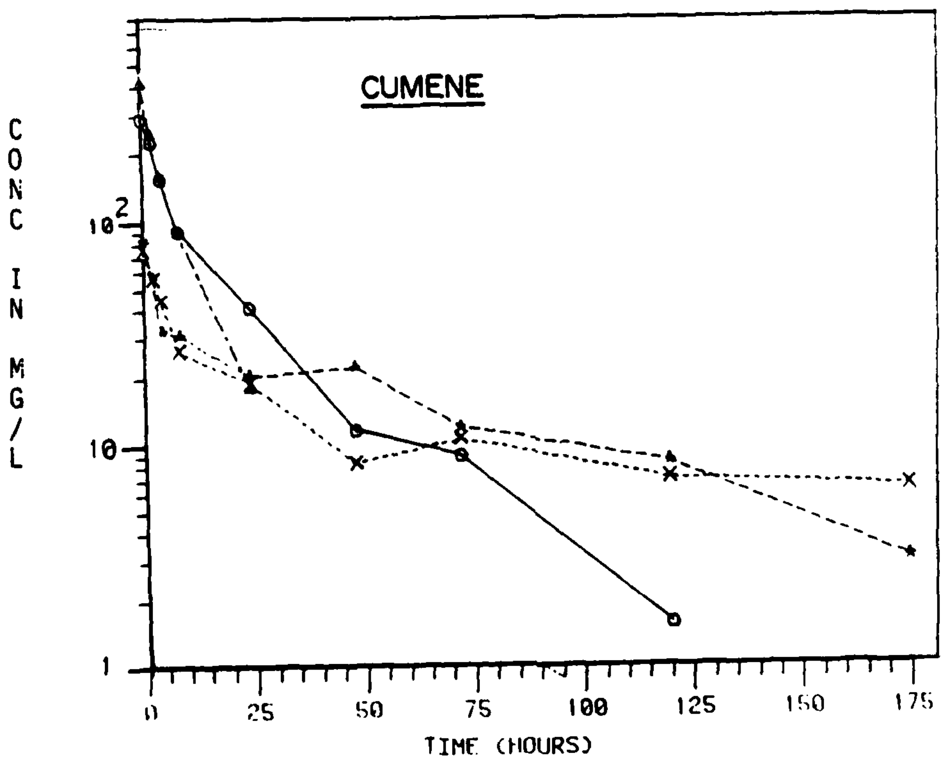


Figure B-34. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

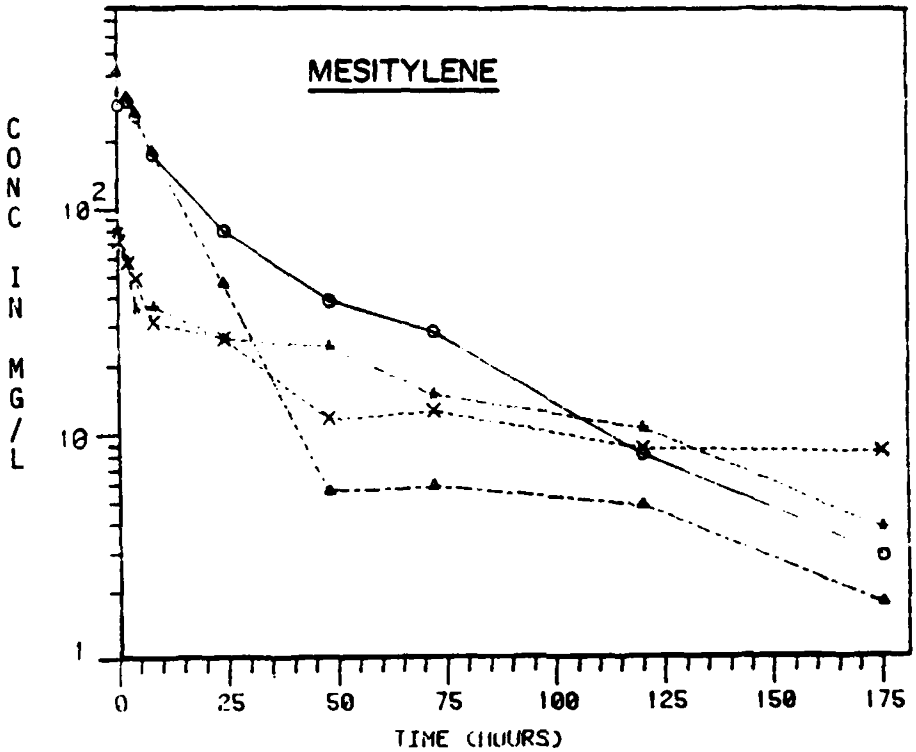


Figure B-35. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

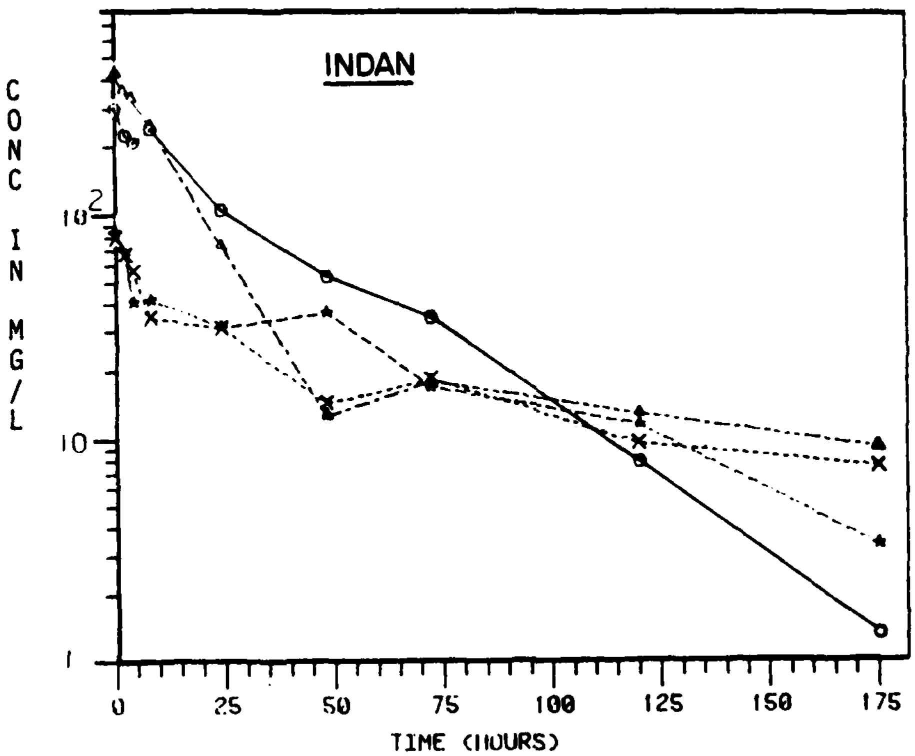


Figure B-36. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

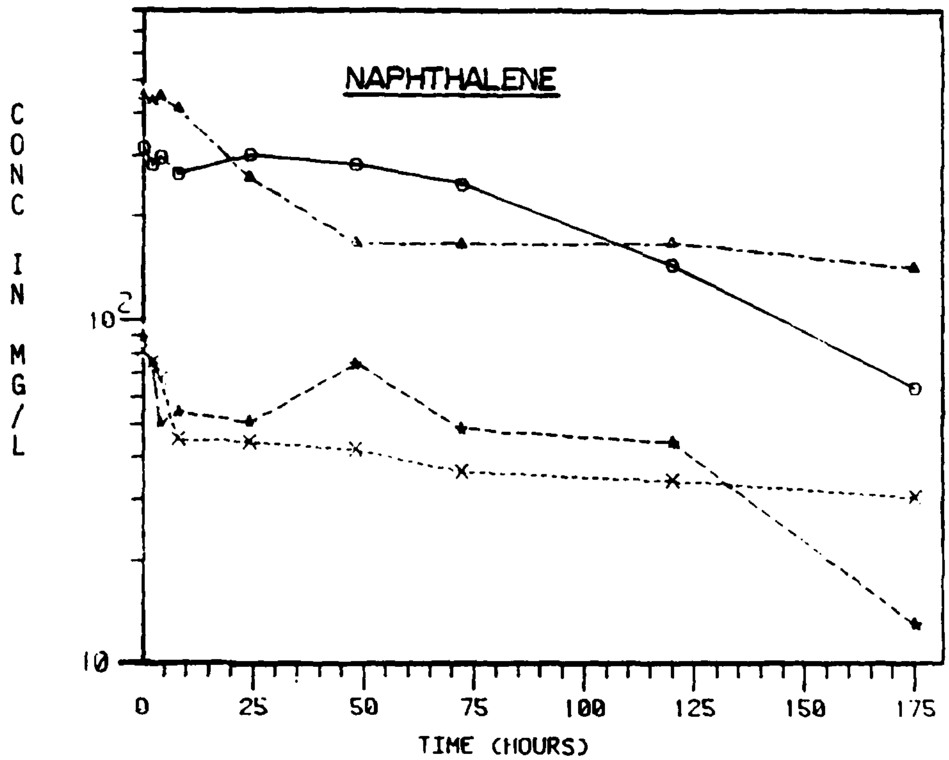


Figure B-37. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

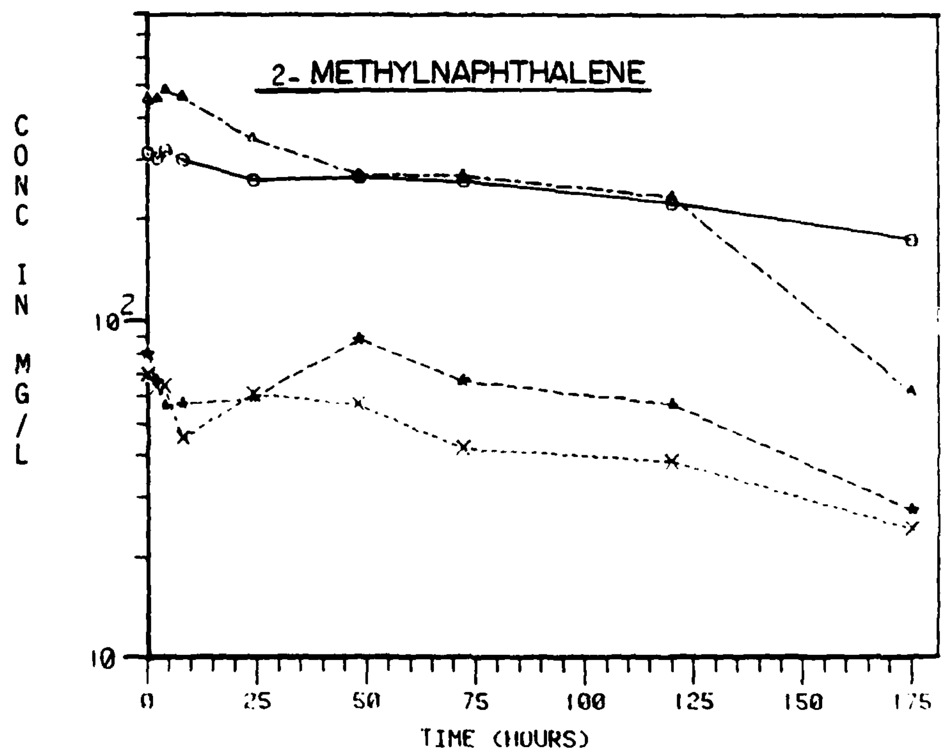


Figure B-38. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

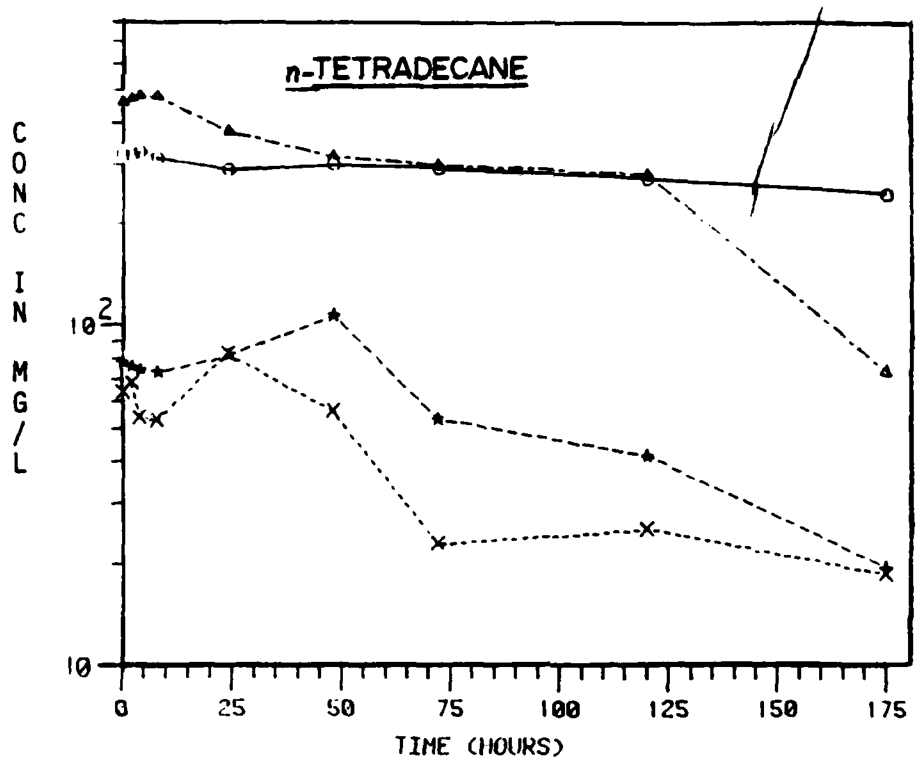


Figure B-39. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

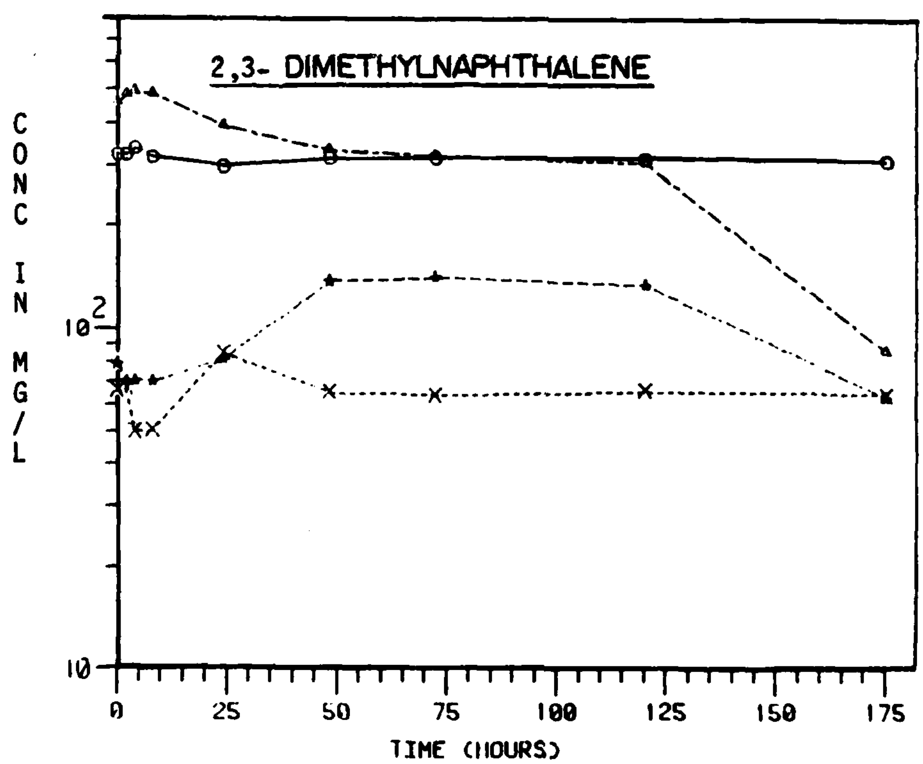


Figure B-40. 8-10-82 Bayou Chico Quiescent Fate Screen, Model Fuel

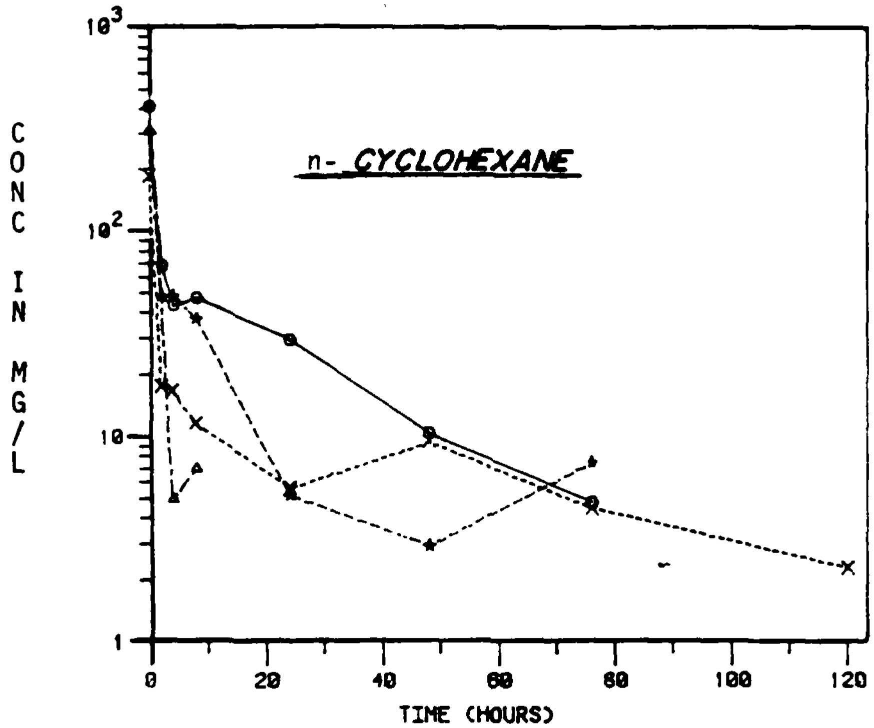


Figure B-41. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

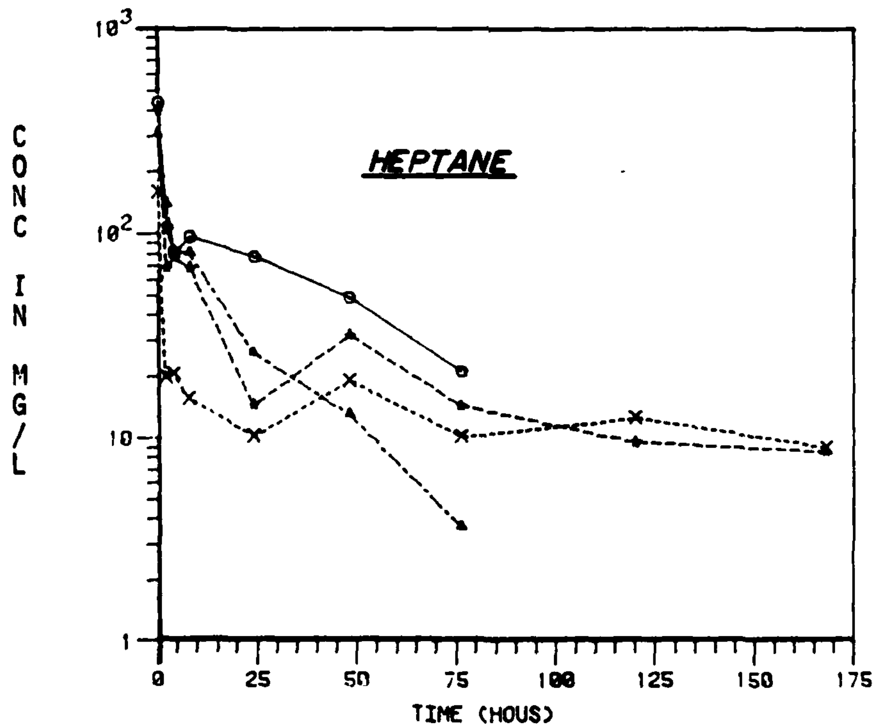


Figure B-42. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

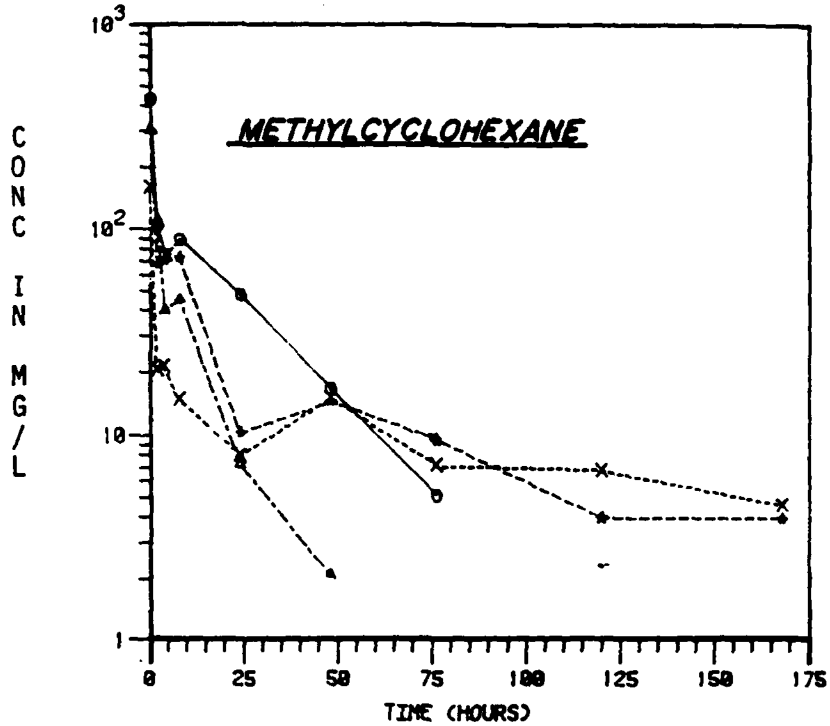


Figure B-43. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

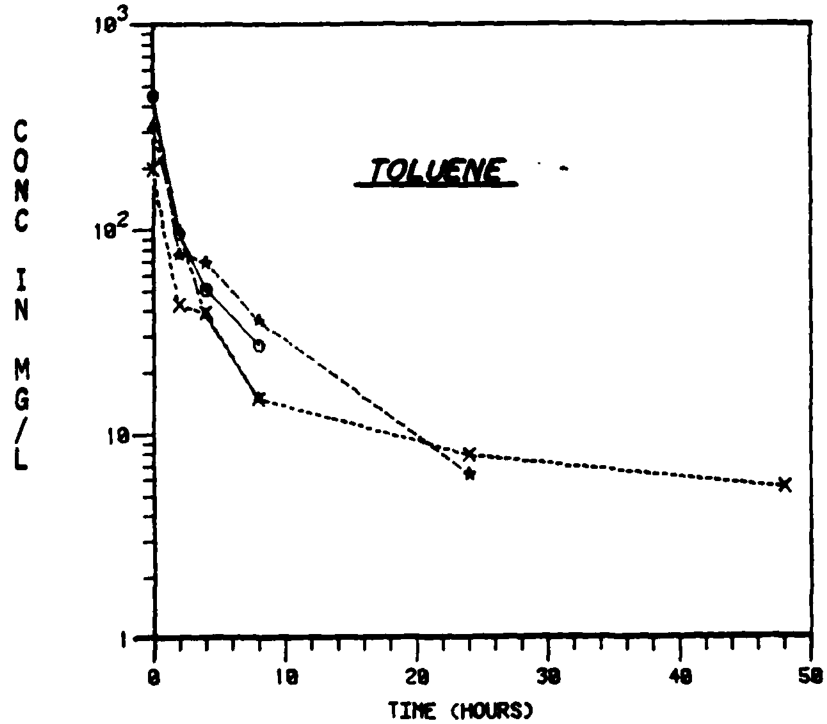


Figure B-44. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

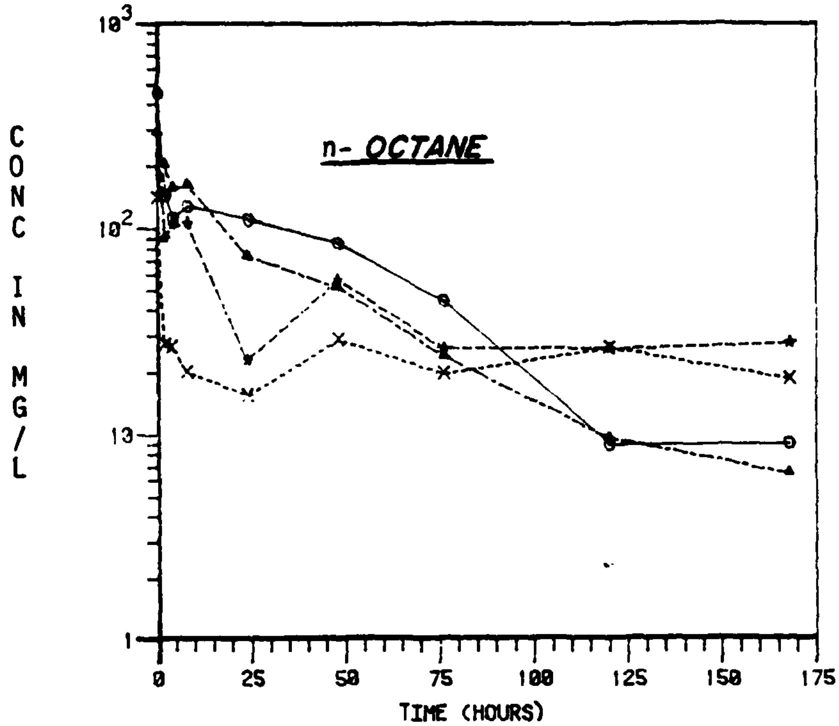


Figure B-45. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

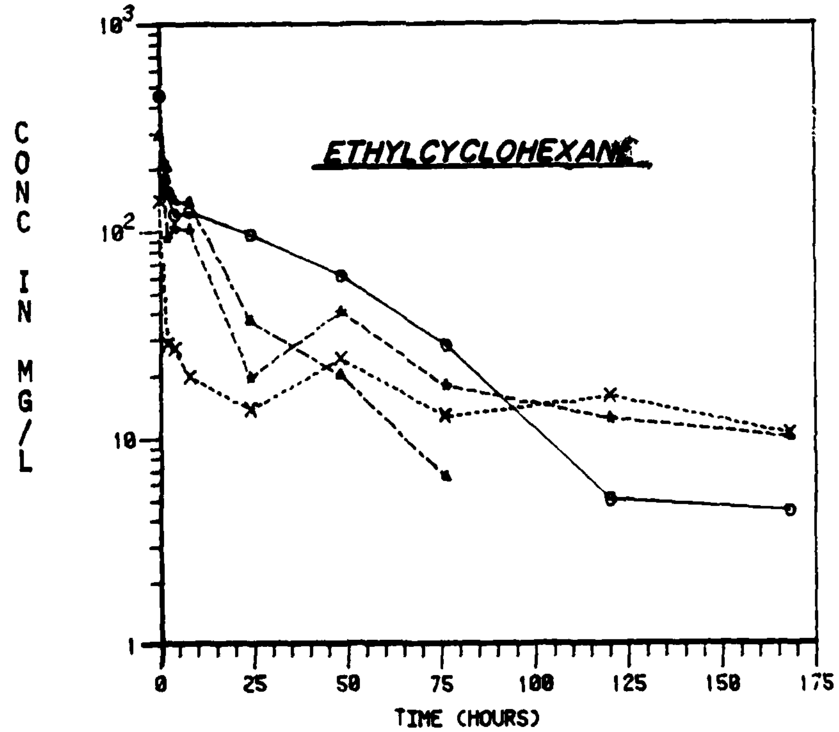


Figure B-46. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

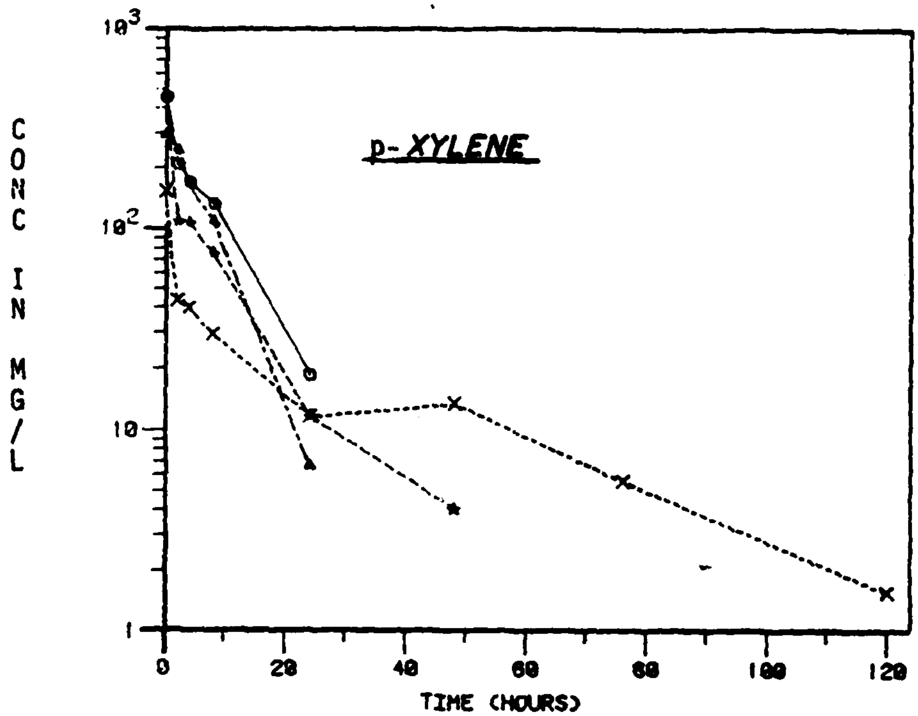


Figure B-47. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

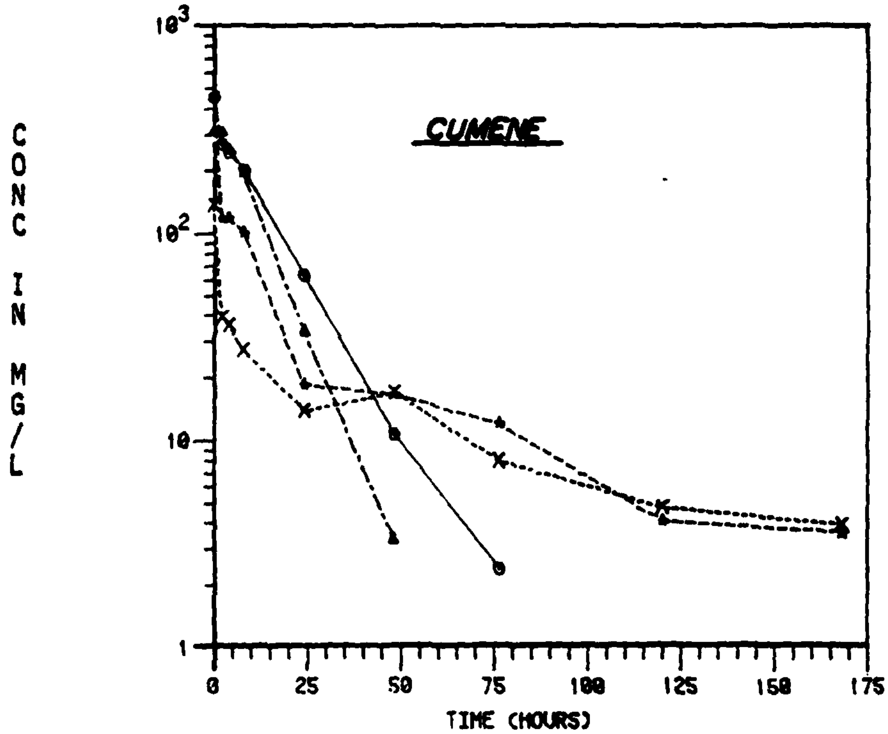


Figure B-48. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

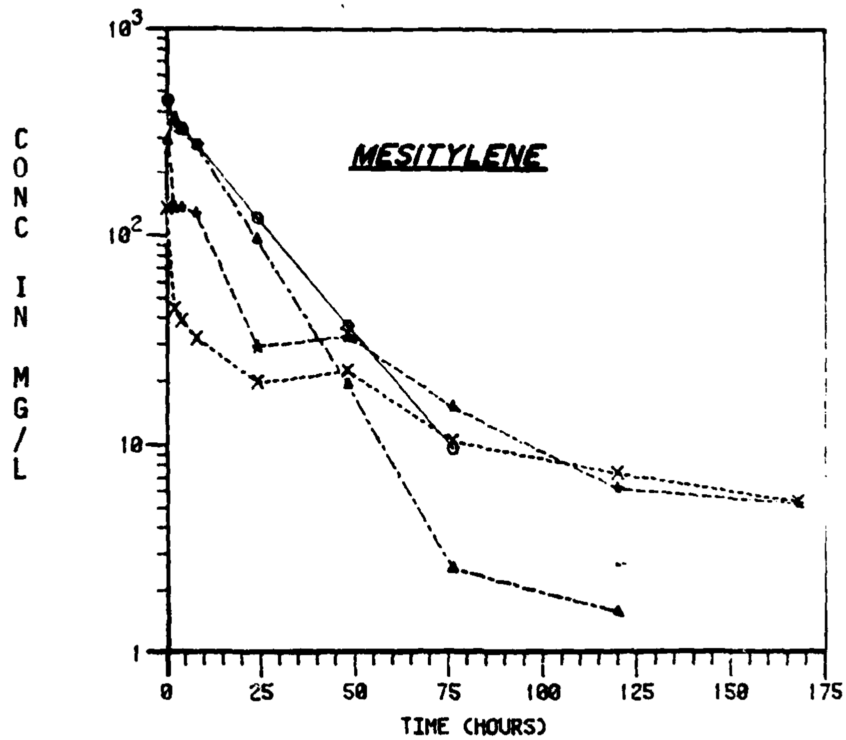


Figure B-49. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

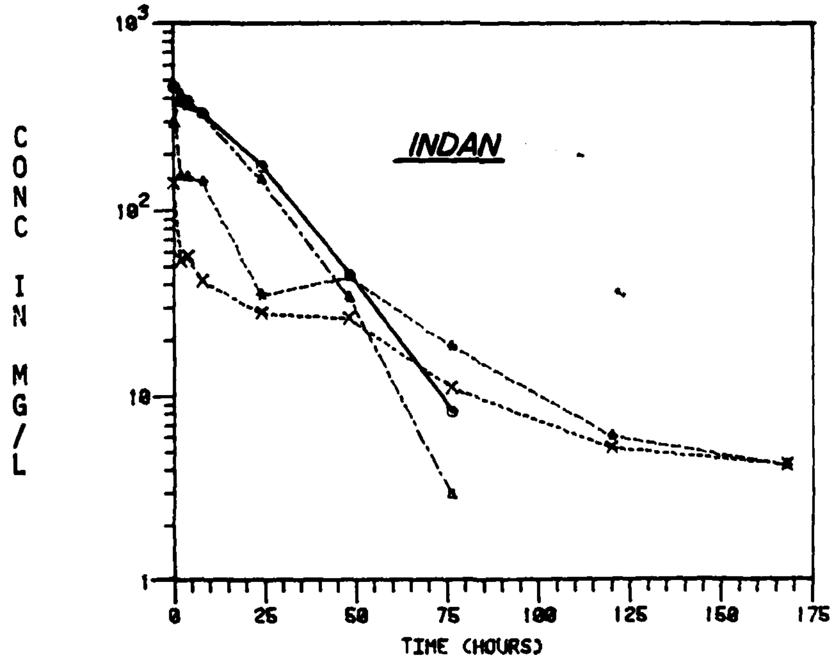


Figure B-50. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

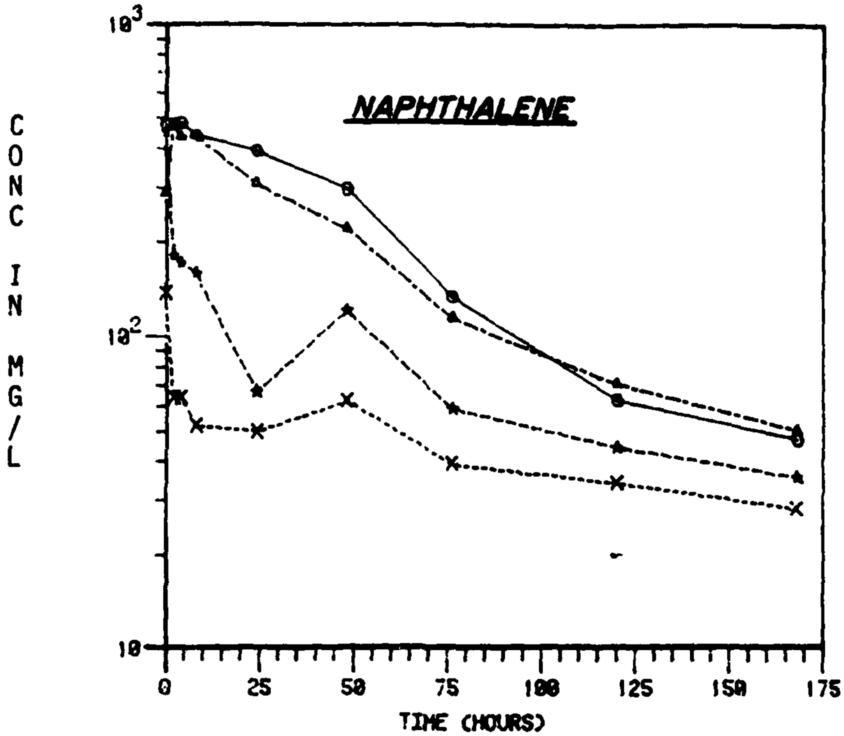


Figure B-51. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

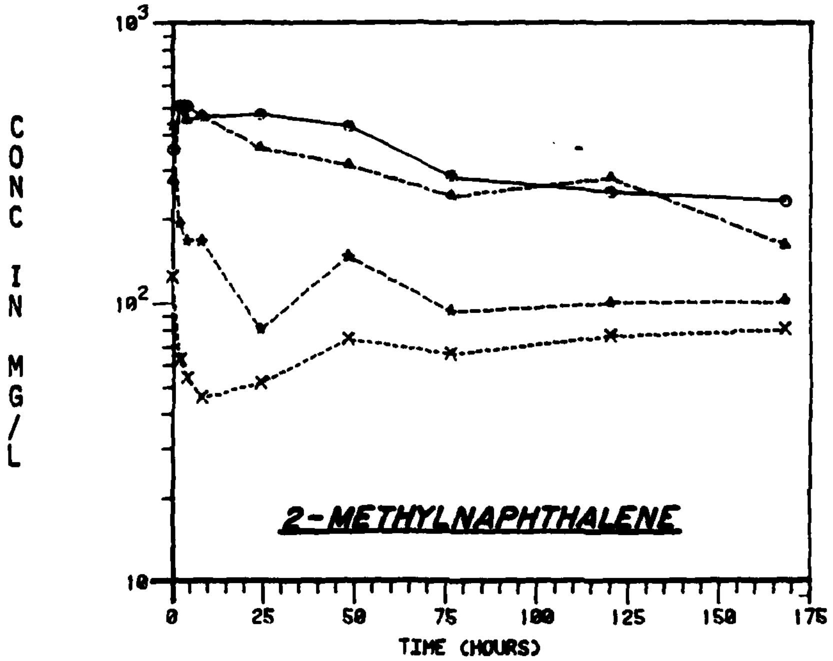


Figure B-52. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

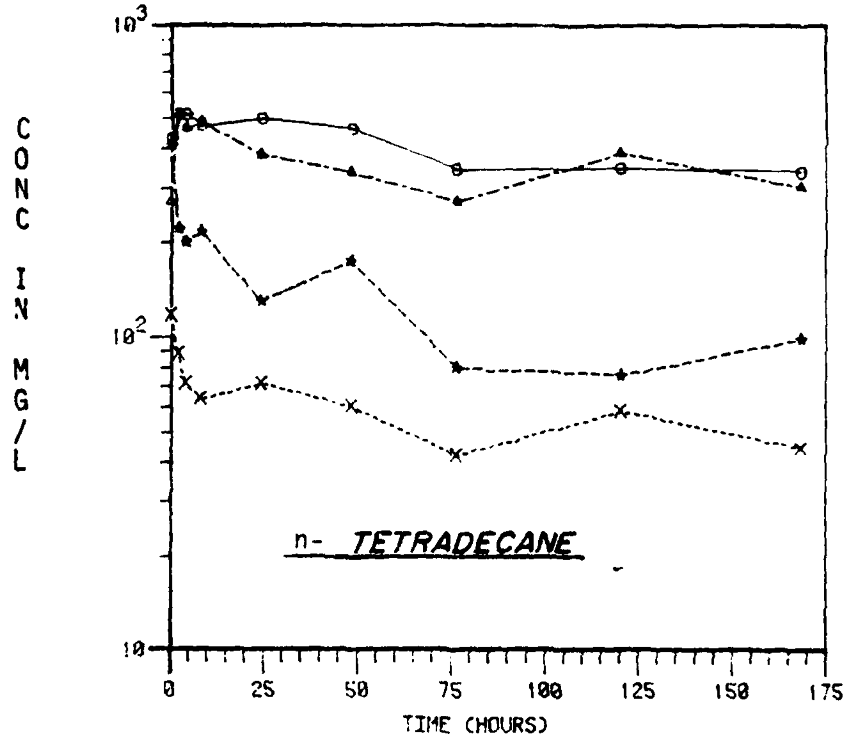


Figure B-53. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

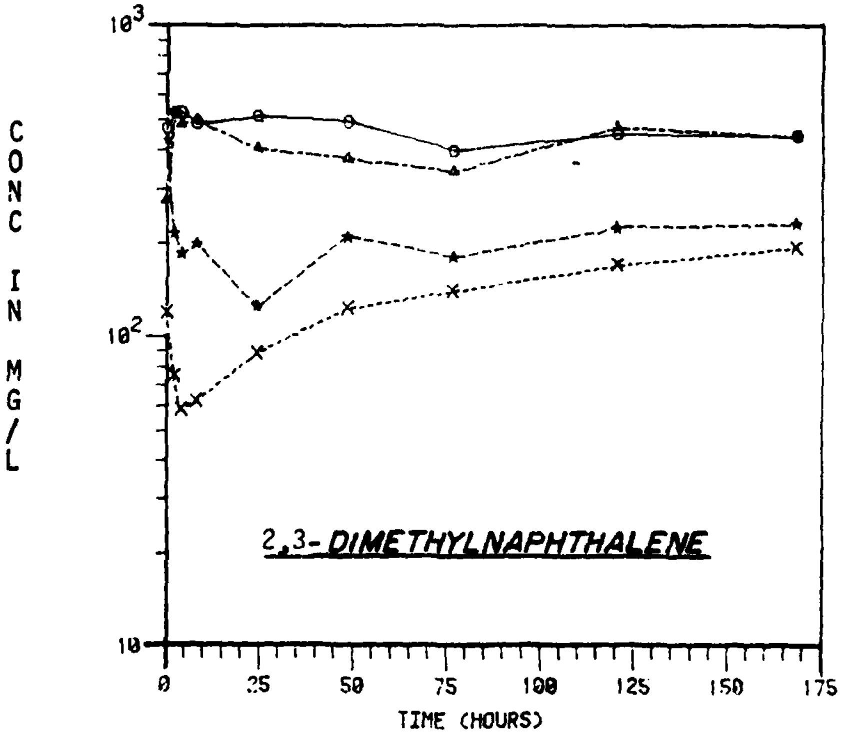


Figure B-54. 8-18-82 Escambia River Quiescent Fate Screen, Model Fuel

APPENDIX C

JP-4 - SHAKEN TESTS

6-30-82 to 10-15-82

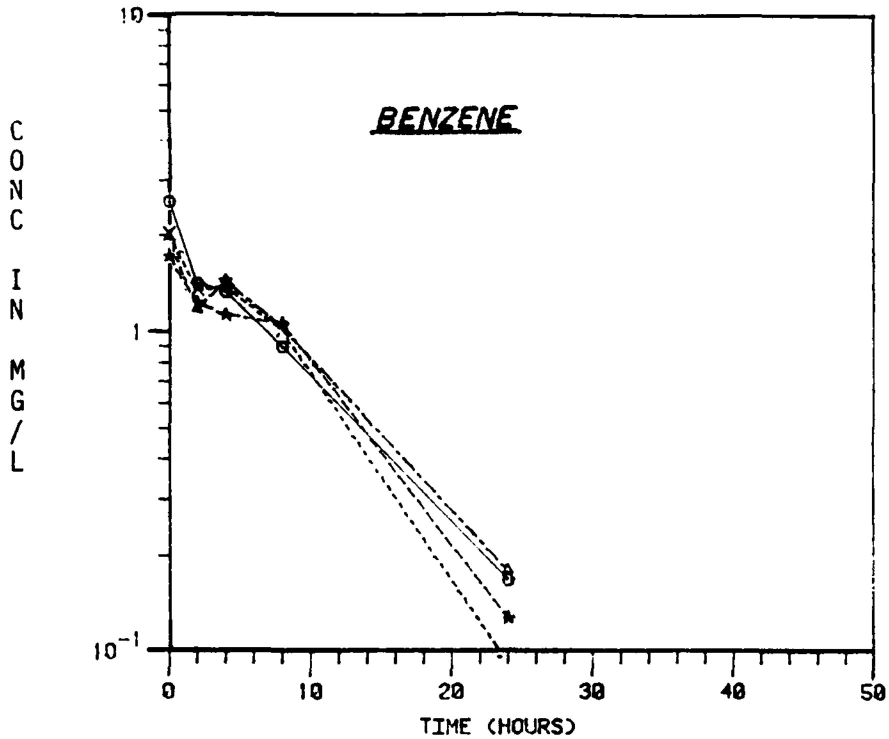


Figure C-1. 6-30-82 Escambia River Shaken Fate Screen, JP-4

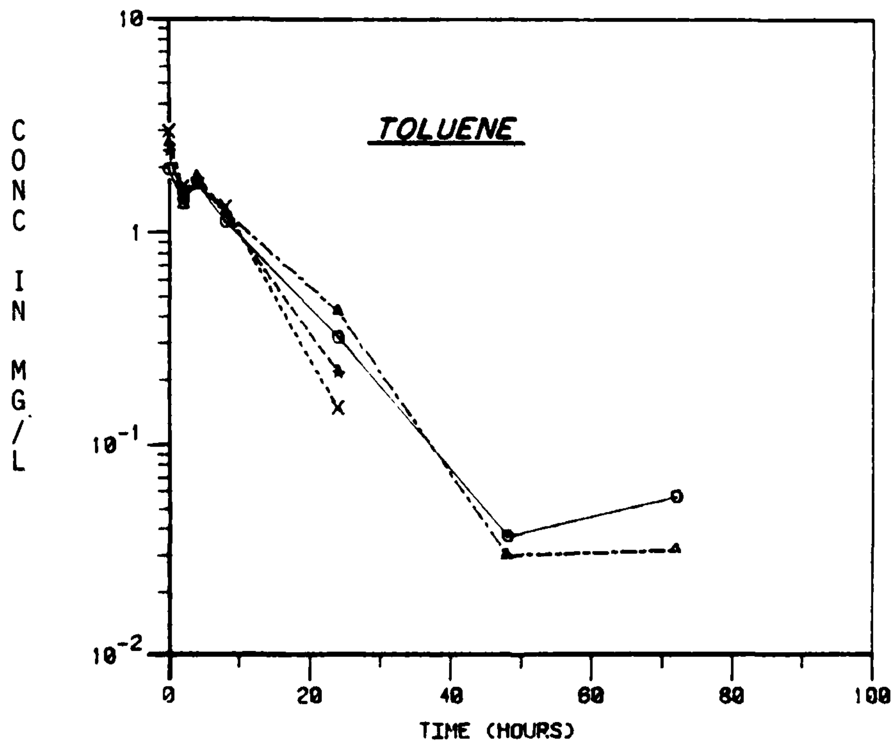


Figure C-2. 6-30-82 Escambia River Shaken Fate Screen, JP-4

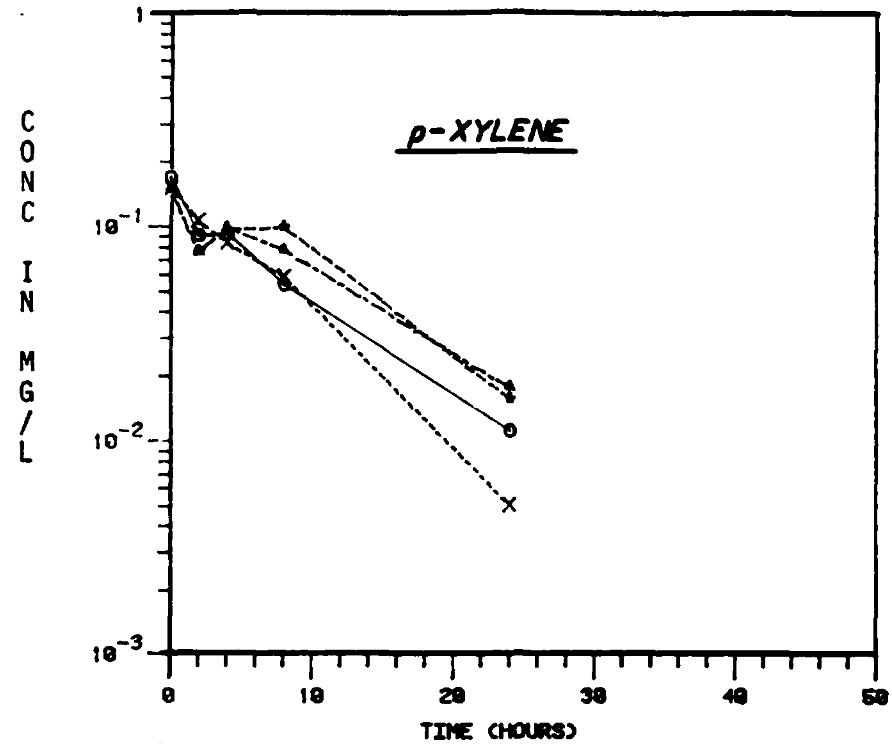


Figure C-3. 6-30-82 Escambia River Shaken Fate Screen, JP-4

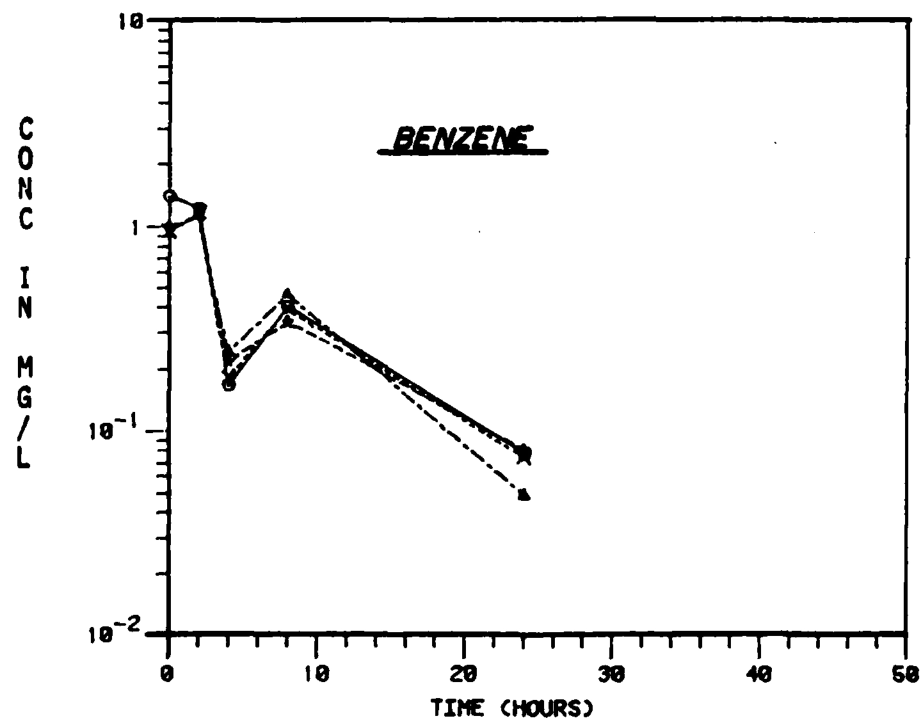


Figure C-4. 7-28-82 Range Point Shaken Fate Screen, JP-4

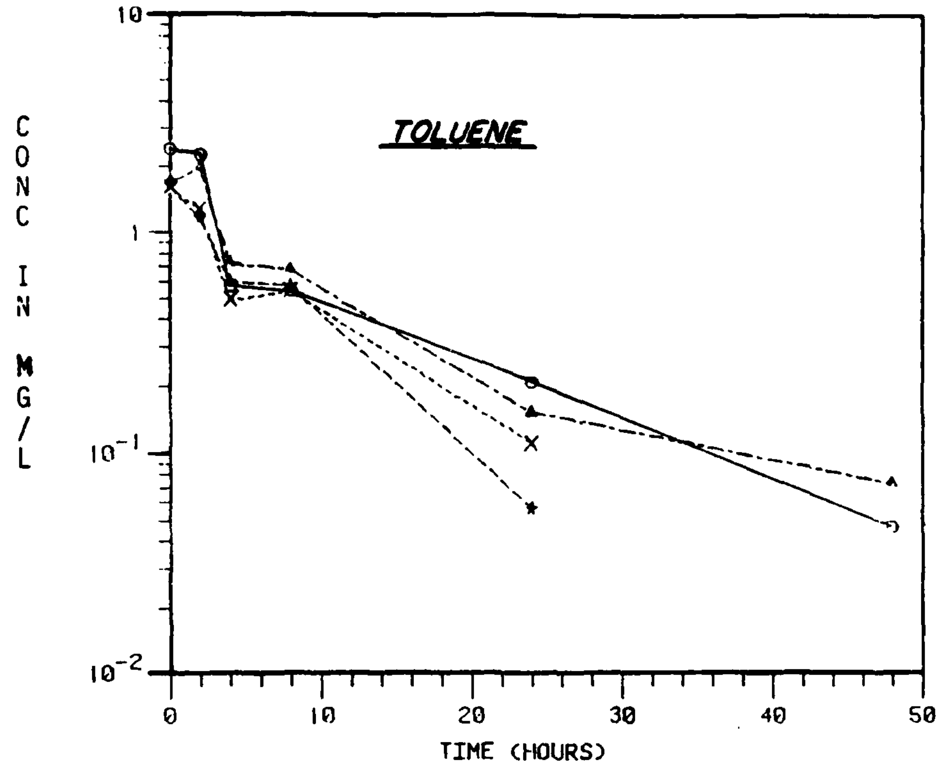


Figure C-5. 7-28-82 Range Point Shaken Fate Screen, JP-4

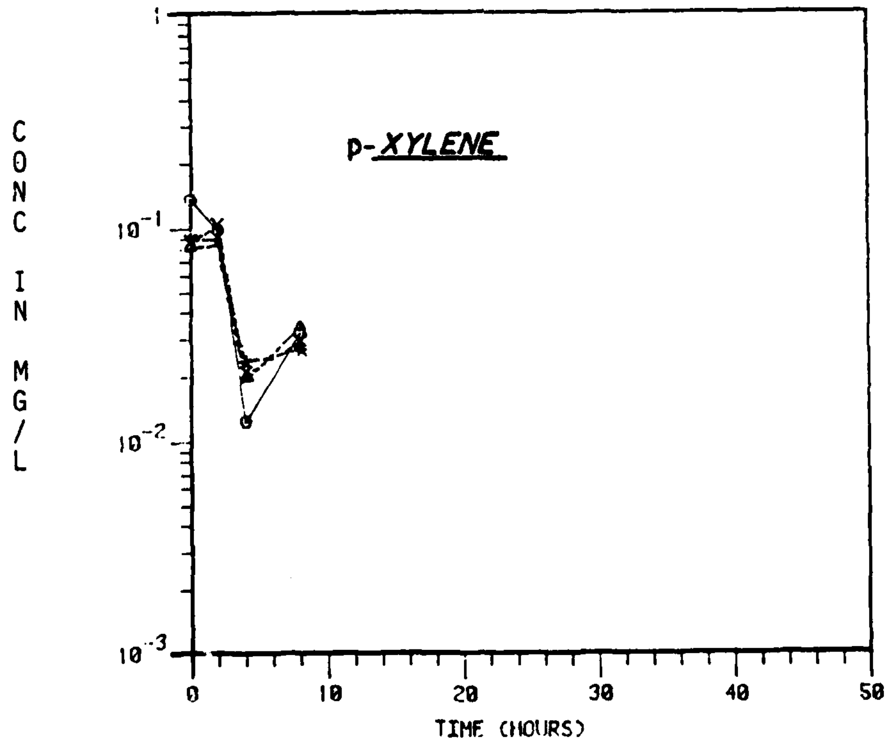


Figure C-6. 7-28-82 Range Point Shaken Fate Screen, JP-4

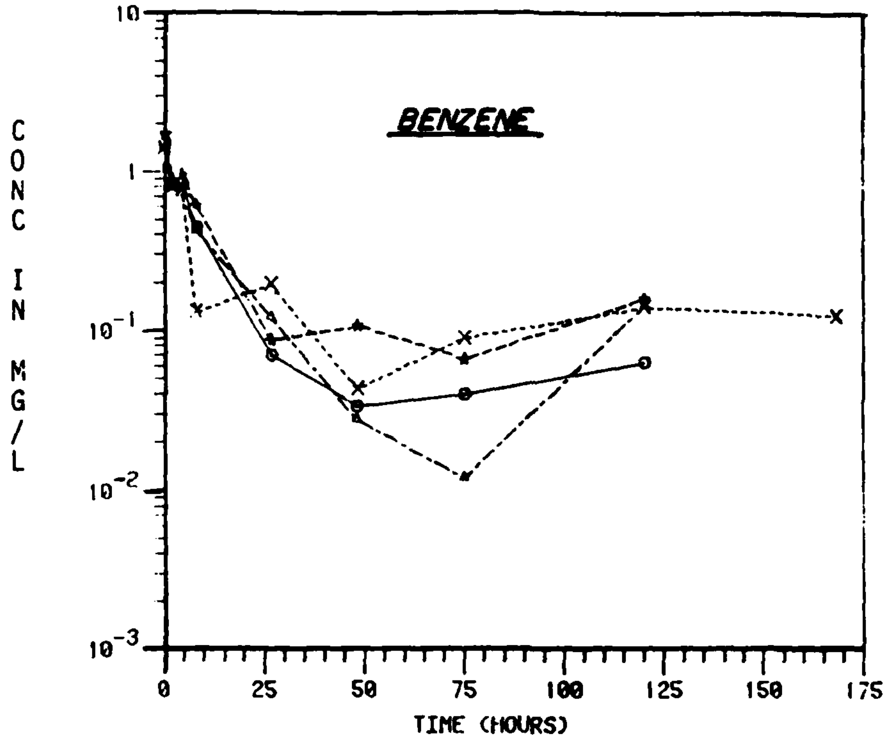


Figure C-7. 10-15-82 Bayou Chico Shaken Fate Screen, JP-4

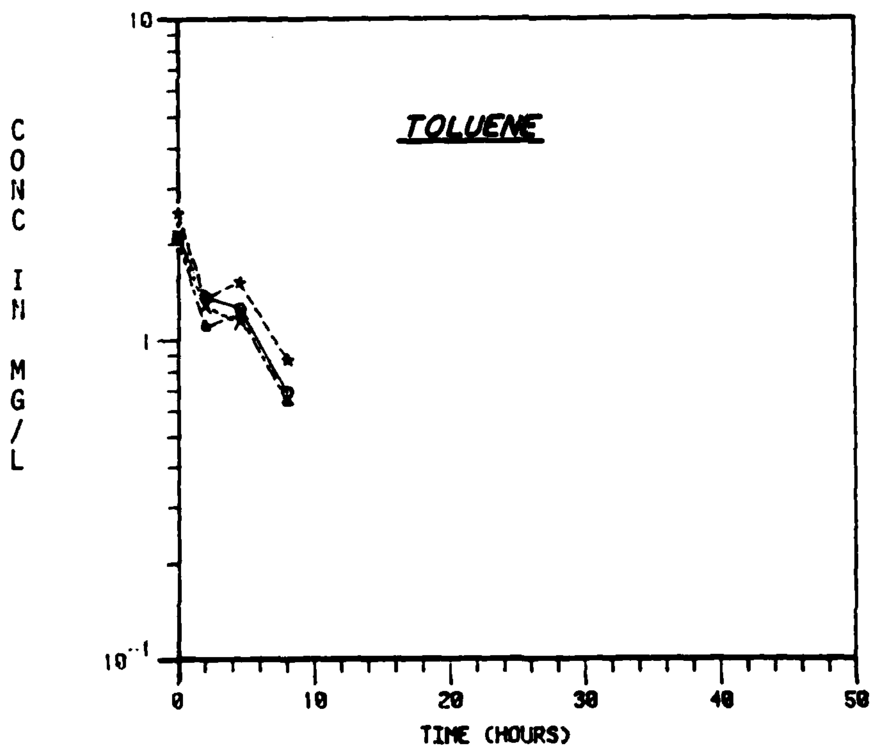


Figure C-8. 10-15-82 Bayou Chico Shaken Fate Screen, JP-4

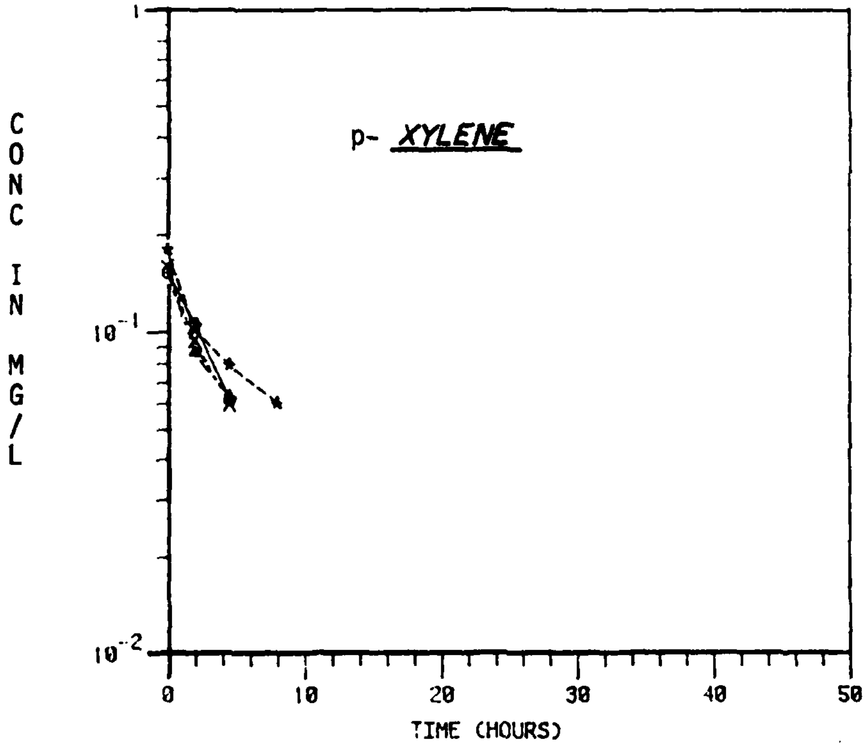


Figure C-9. 10-15-82 Bayou Chico Shaken Fate Screen, JP-4

APPENDIX D

JP-4 - QUIESCENT TESTS

6-30-82 to 10-15-82

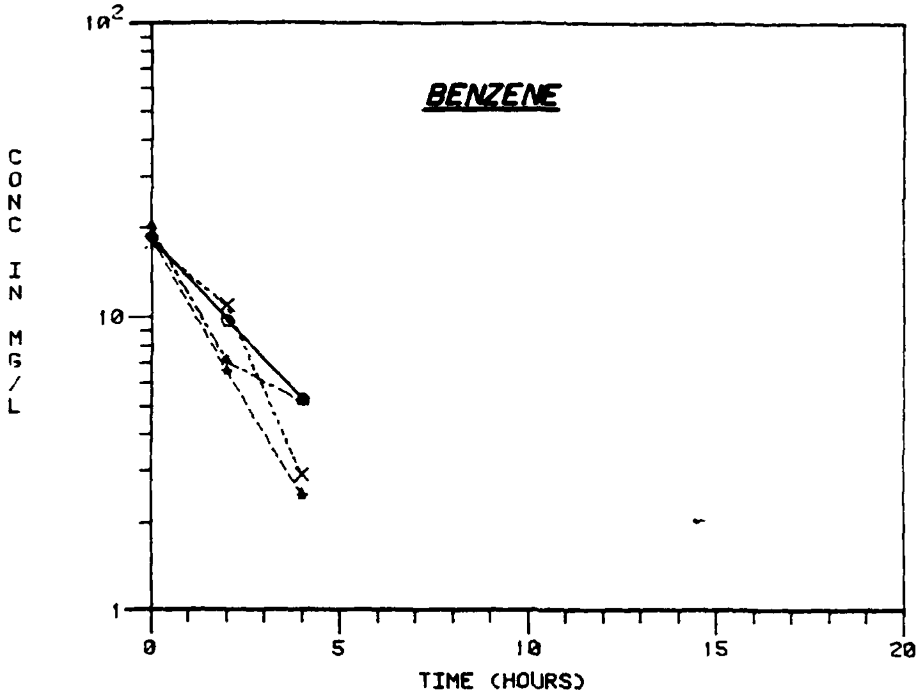


Figure D-1. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

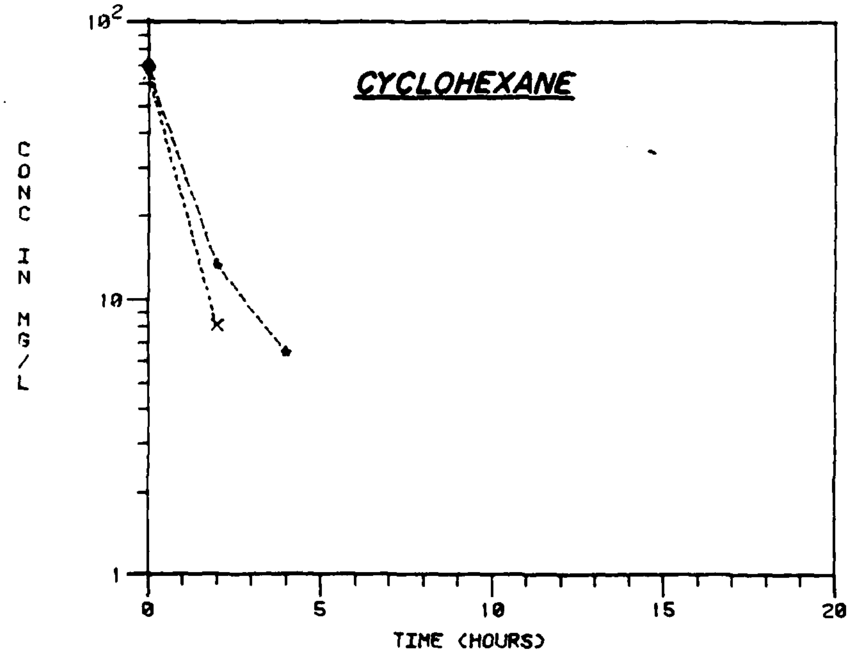


Figure D-2. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

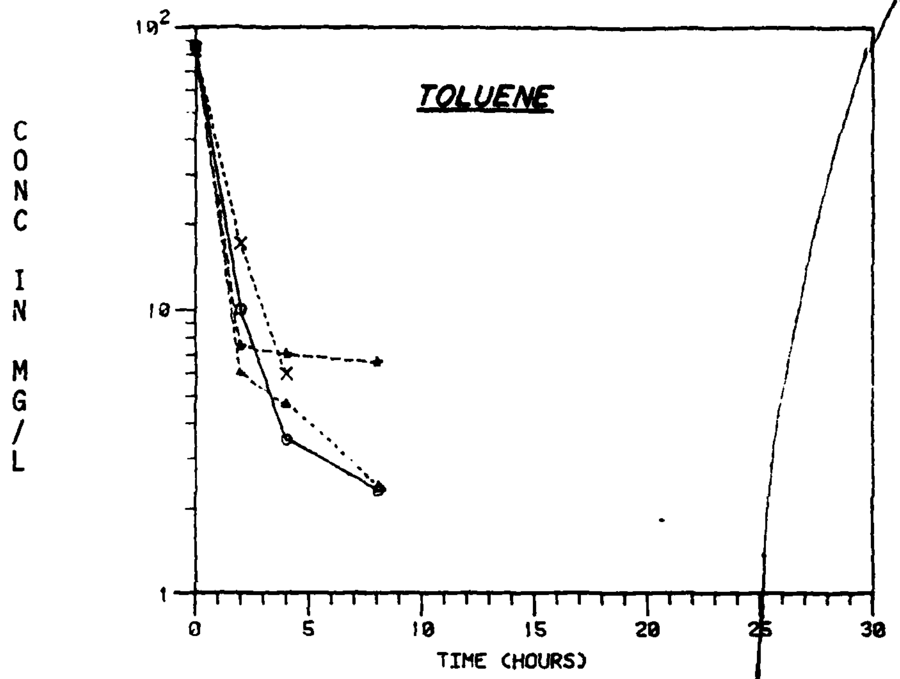


Figure D-3. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

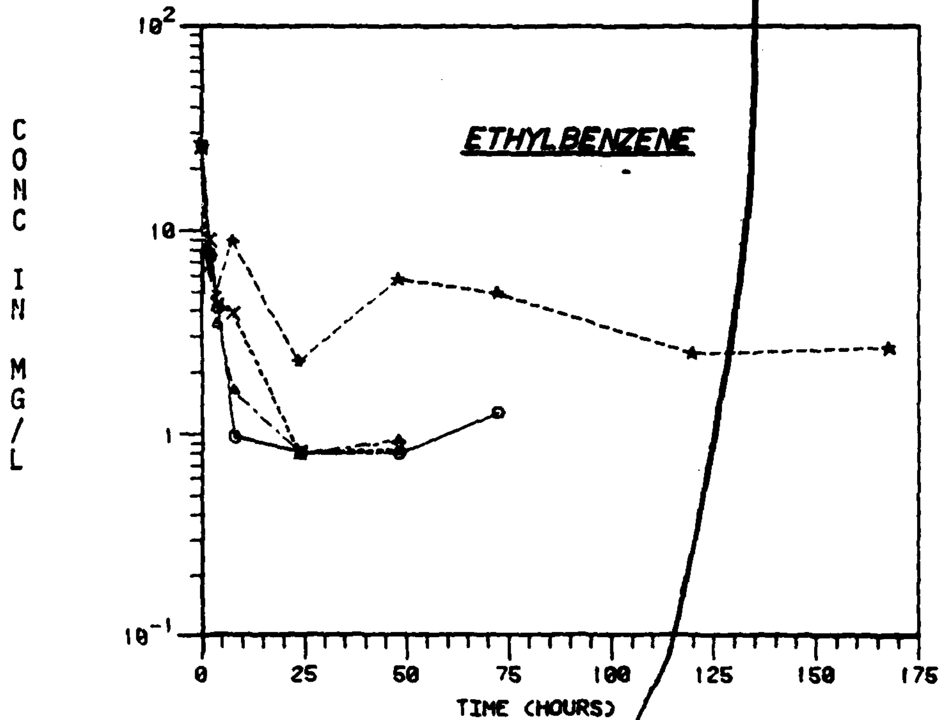


Figure D-4. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

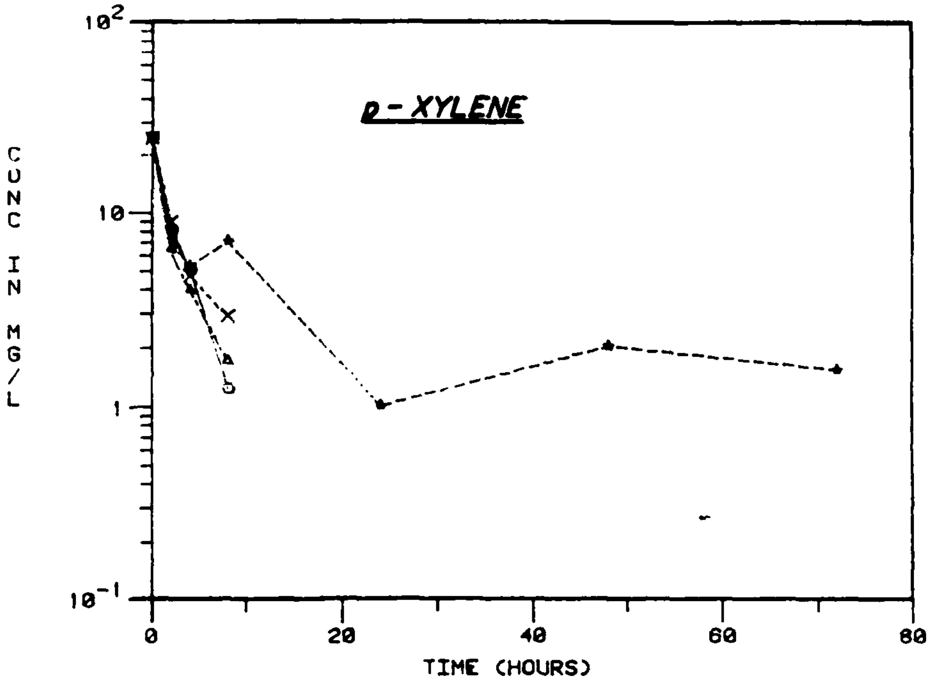


Figure D-5. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

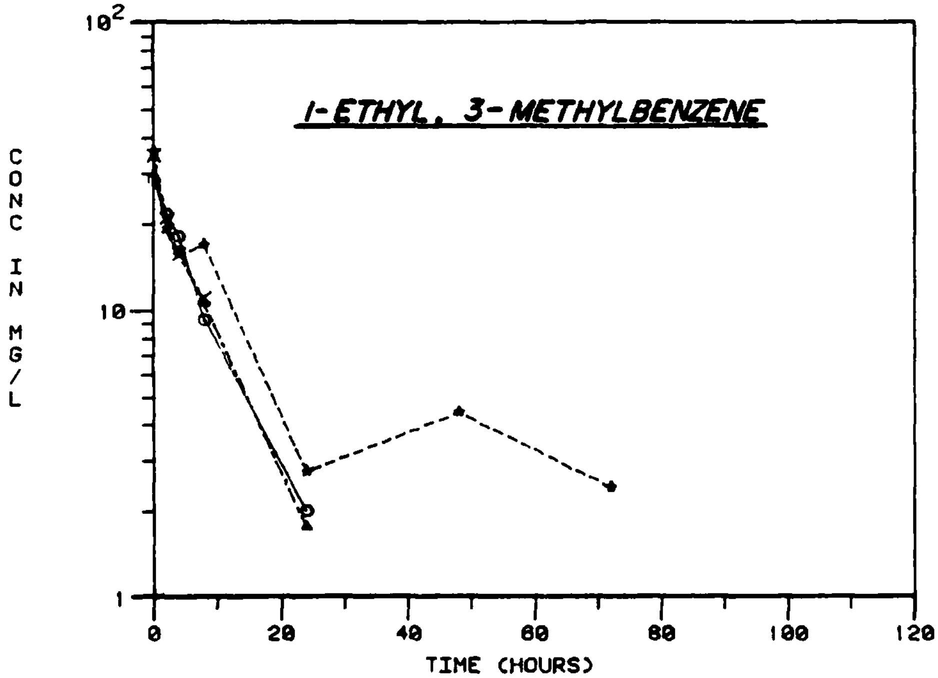


Figure D-6. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

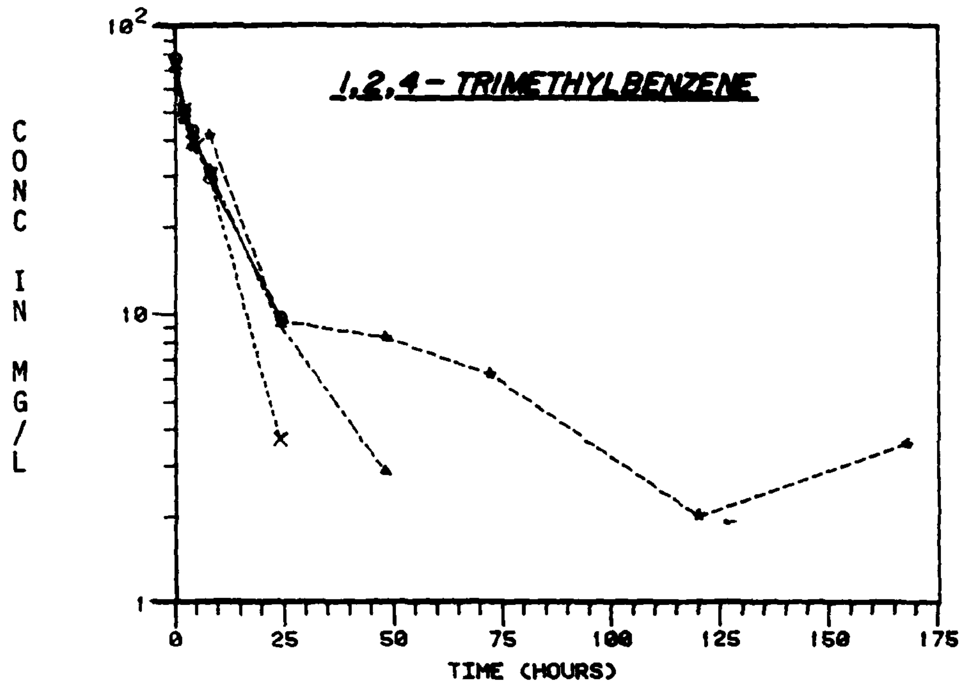


Figure D-7. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

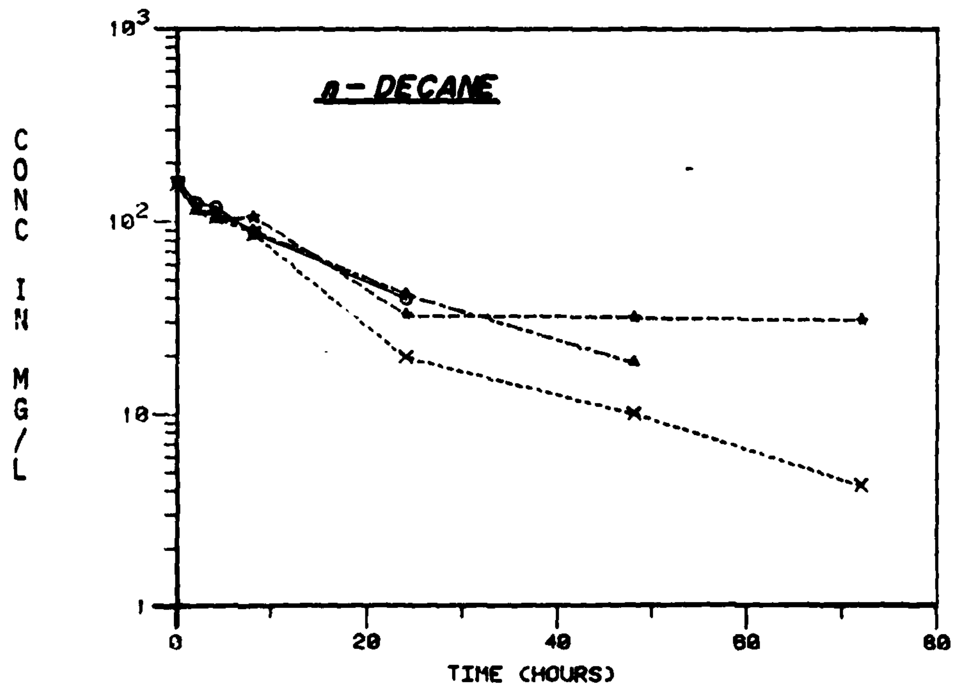


Figure D-8. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

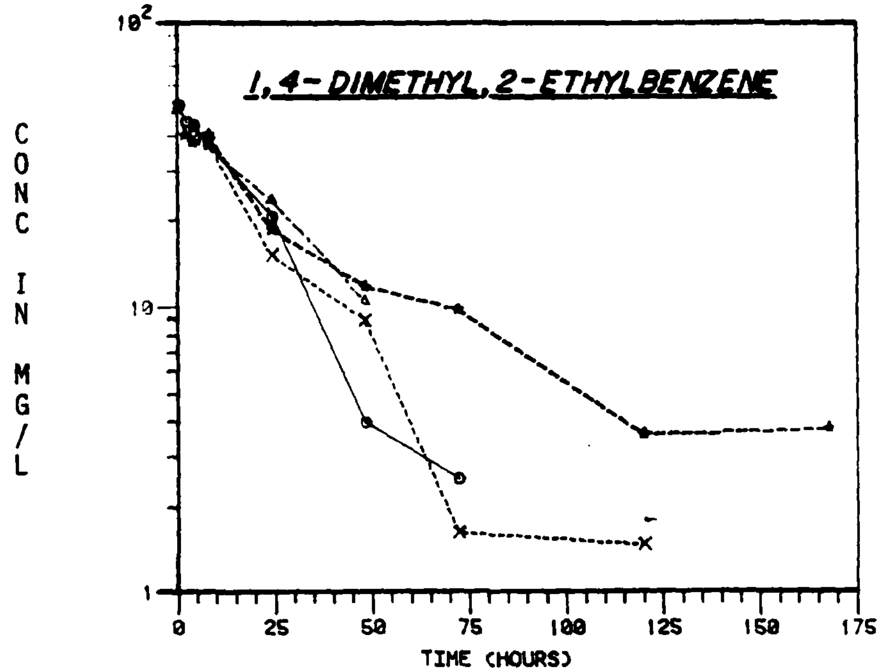


Figure D-9. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

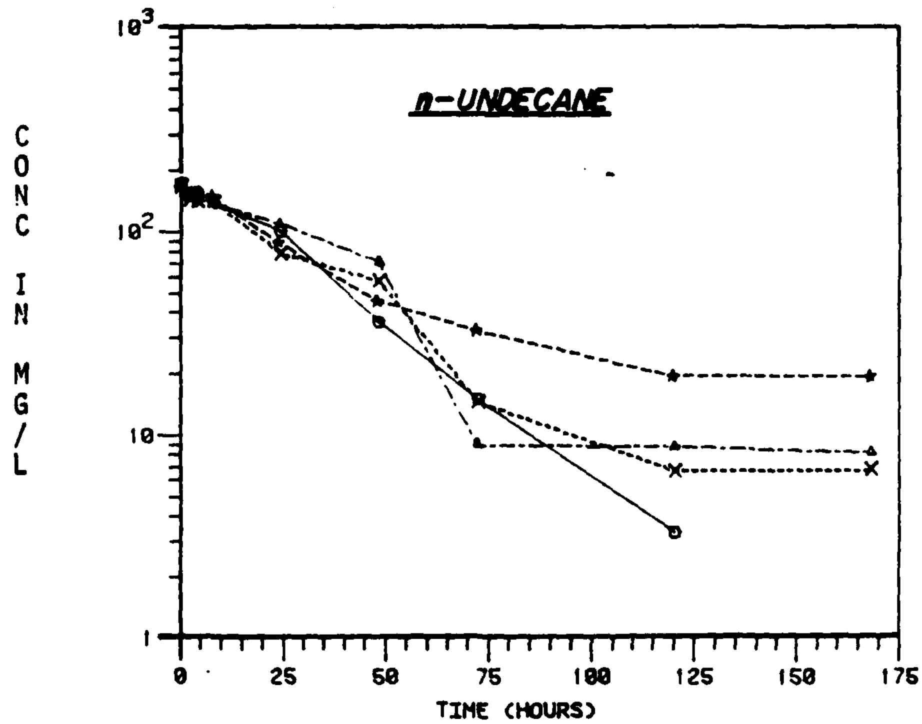


Figure D-10. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

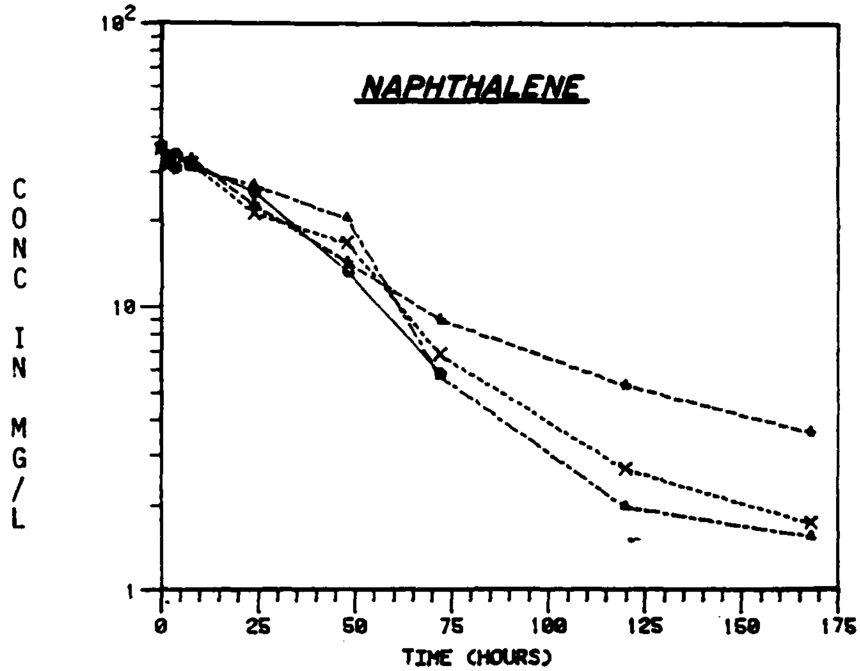


Figure D-11. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

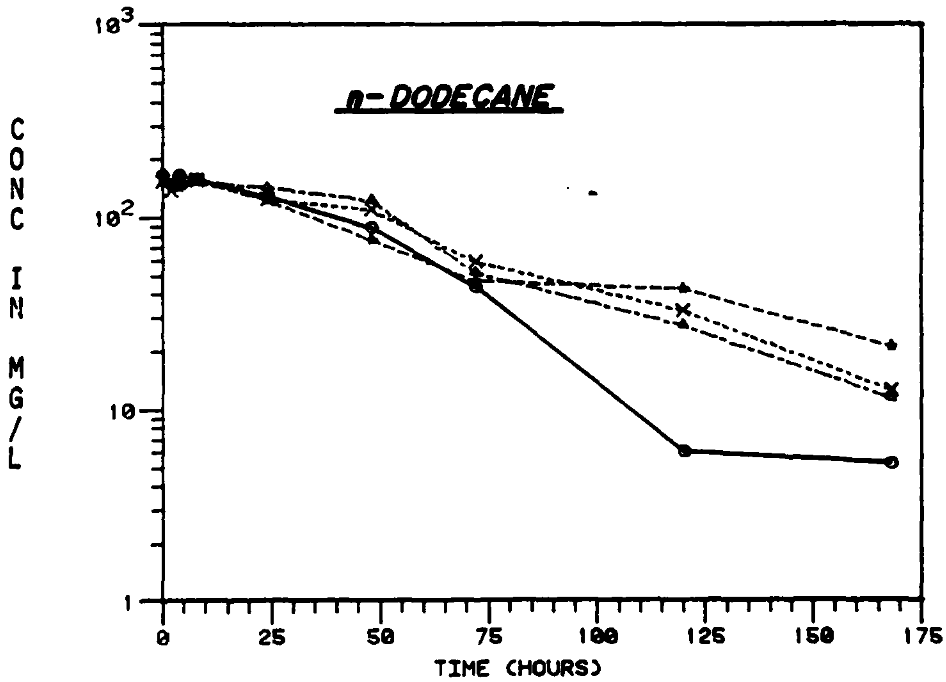


Figure D-12. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

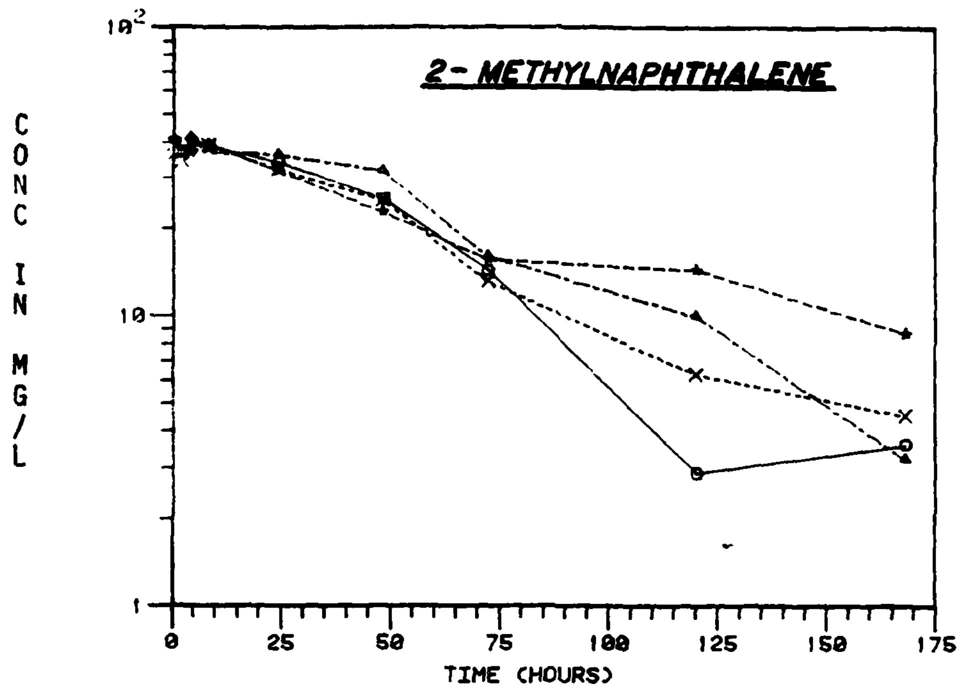


Figure D-13. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

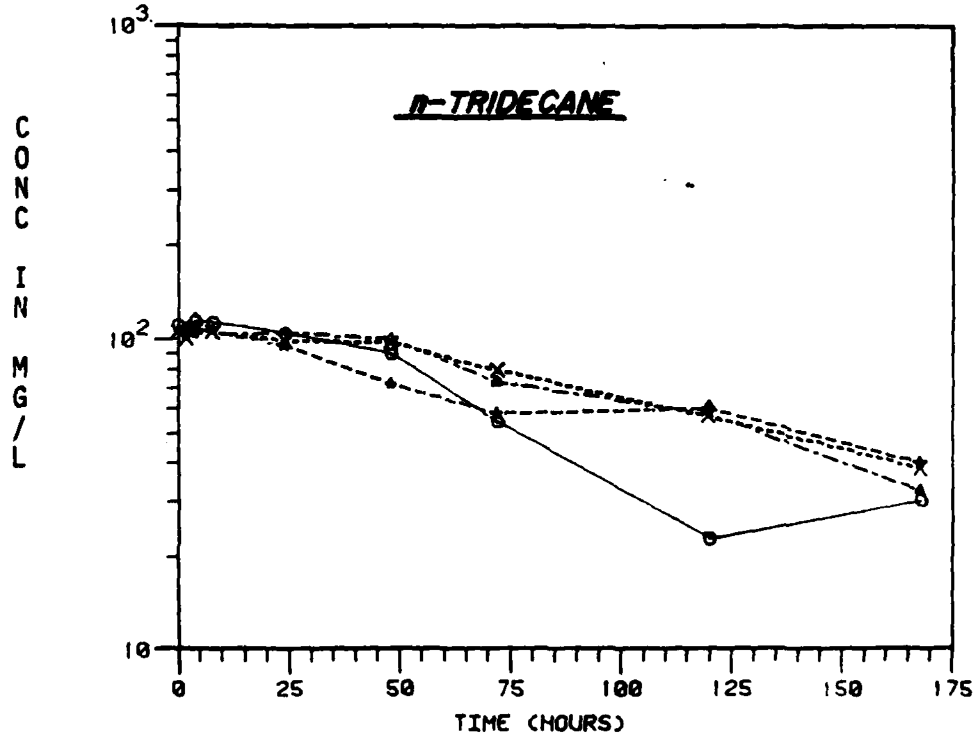


Figure D-14. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

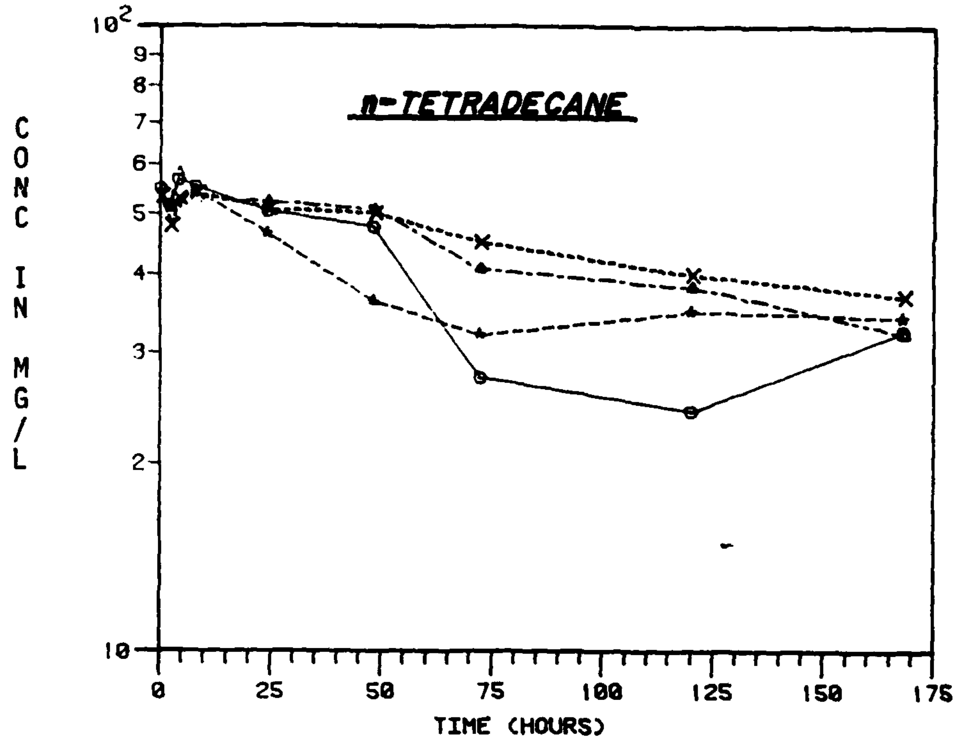


Figure D-15. 6-30-82 Escambia River Quiescent Fate Screen, JP-4

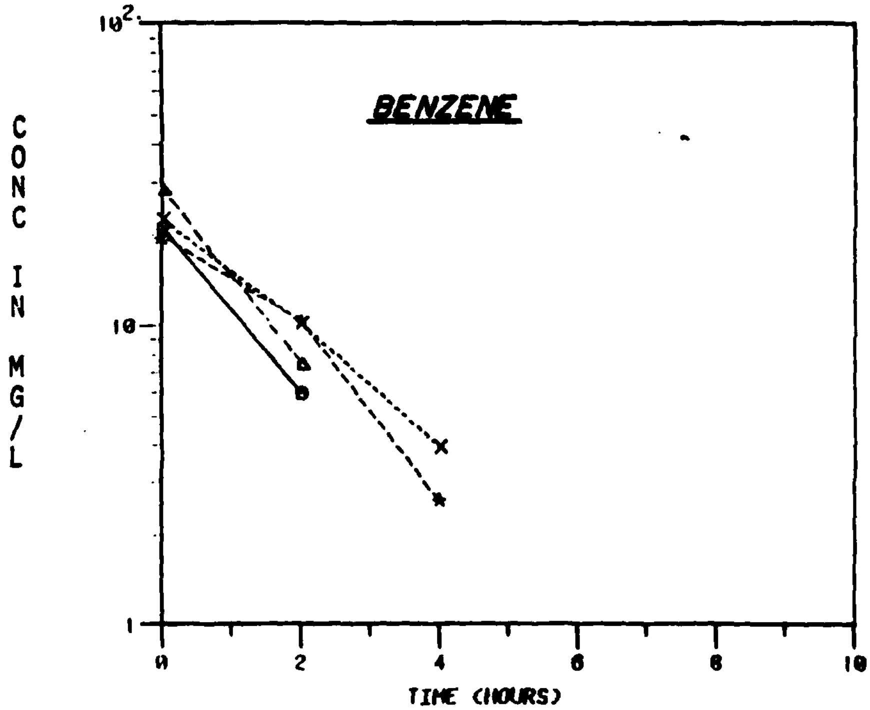


Figure D-16. 7-28-82 Range Point Quiescent Fate Screen, JP-4

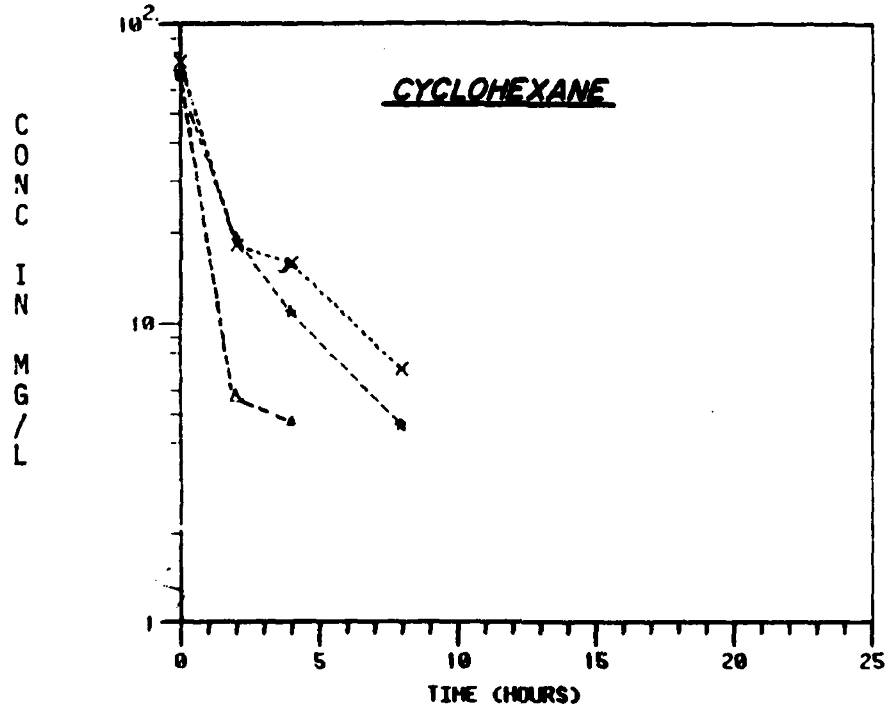


Figure D-17. 7-28-82 Range Point Quiescent Fate Screen, JP-4

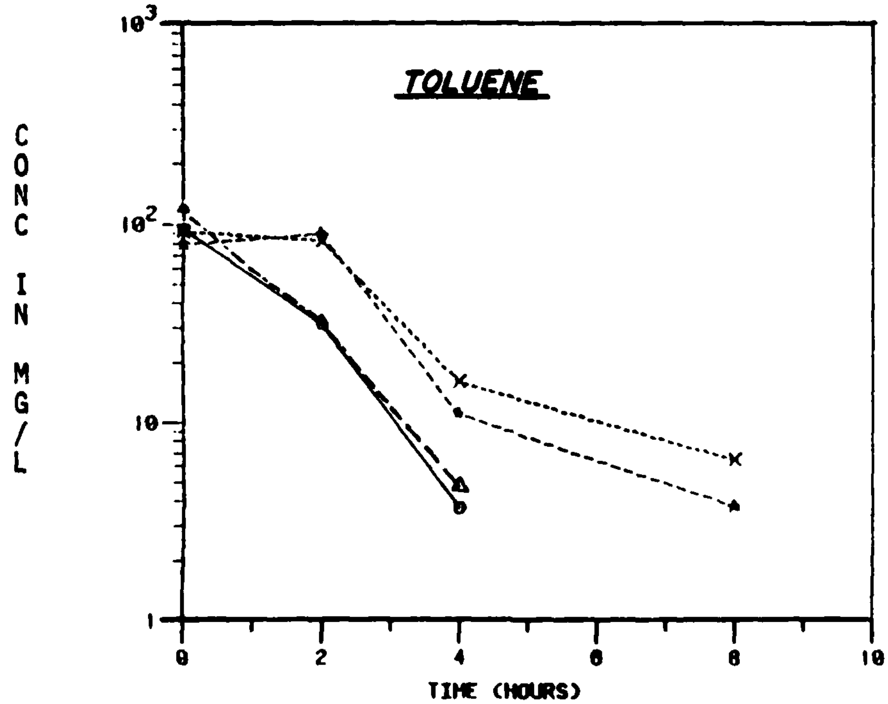


Figure D-18. 7-28-82 Range Point Quiescent Fate Screen, JP-4

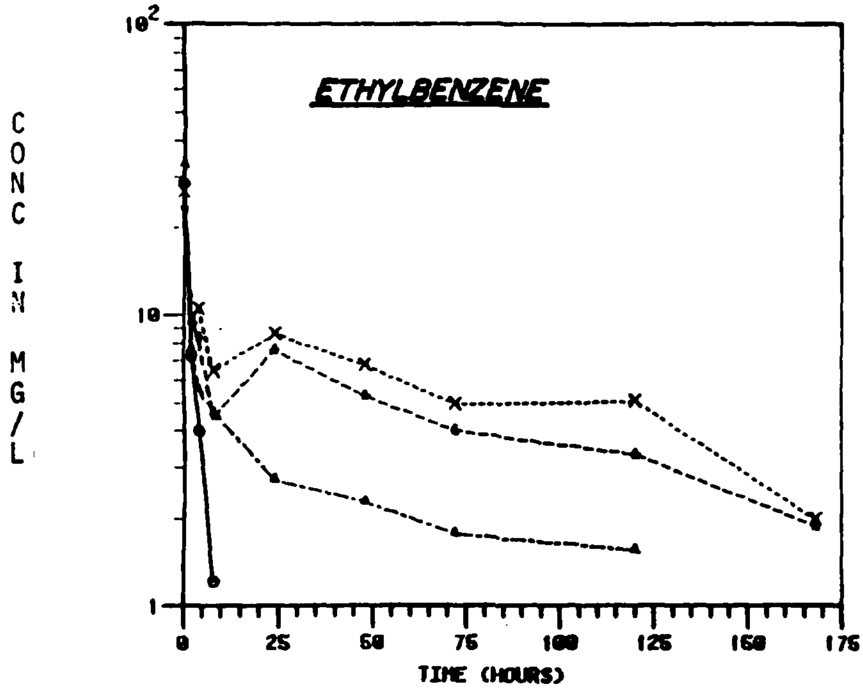


Figure D-19. 7-28-82 Range Point Quiescent Fate Screen, JP-4

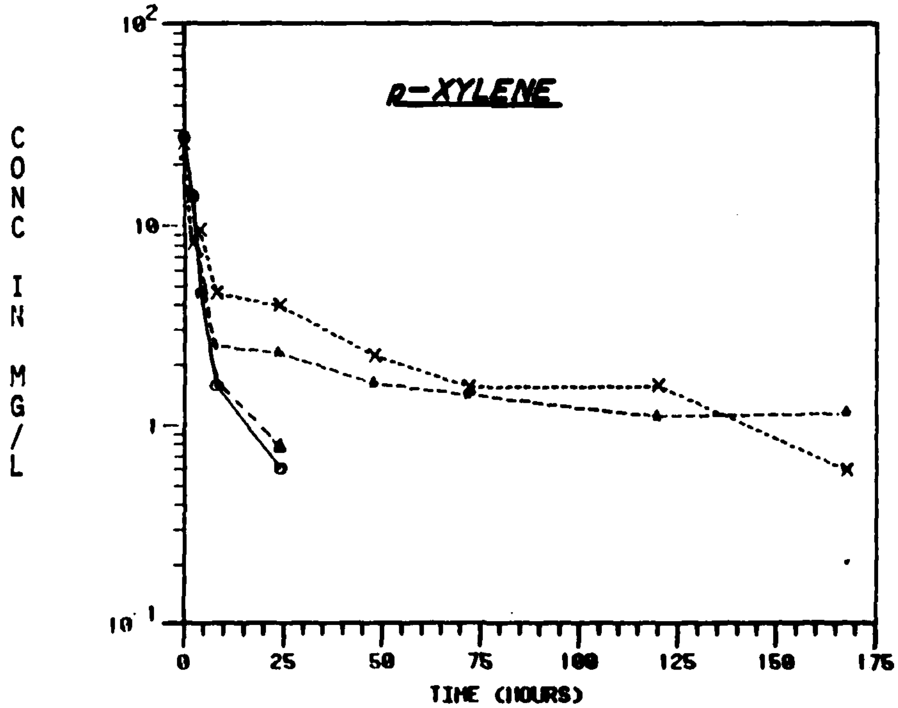


Figure D-20. 7-28-82 Range Point Quiescent Fate Screen, JP-4

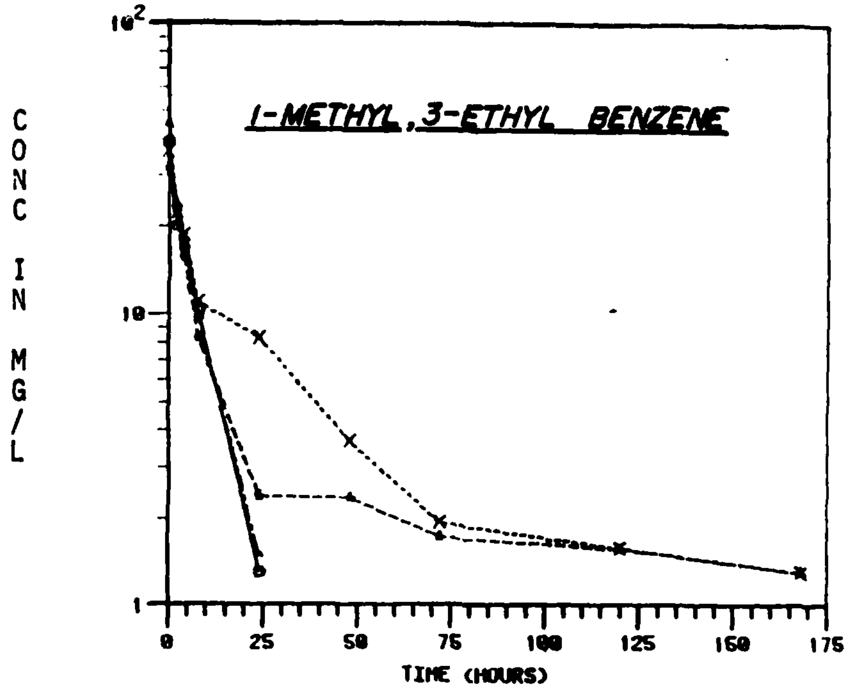


Figure D-21. 7-28-82 Range Point Quiescent Fate Screen, JP-4

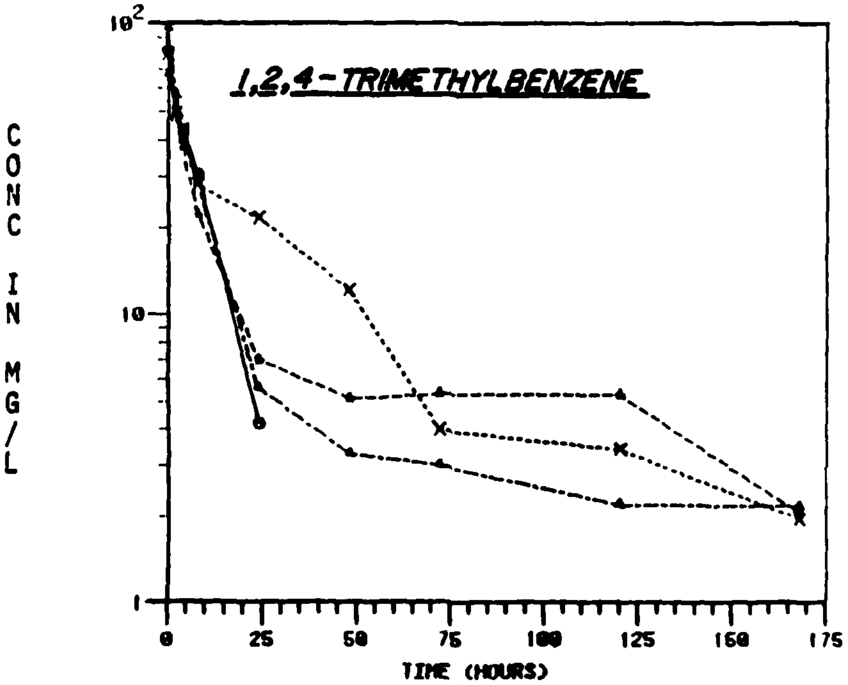


Figure D-22. 7-28-82 Range Point Quiescent Fate Screen, JP-4

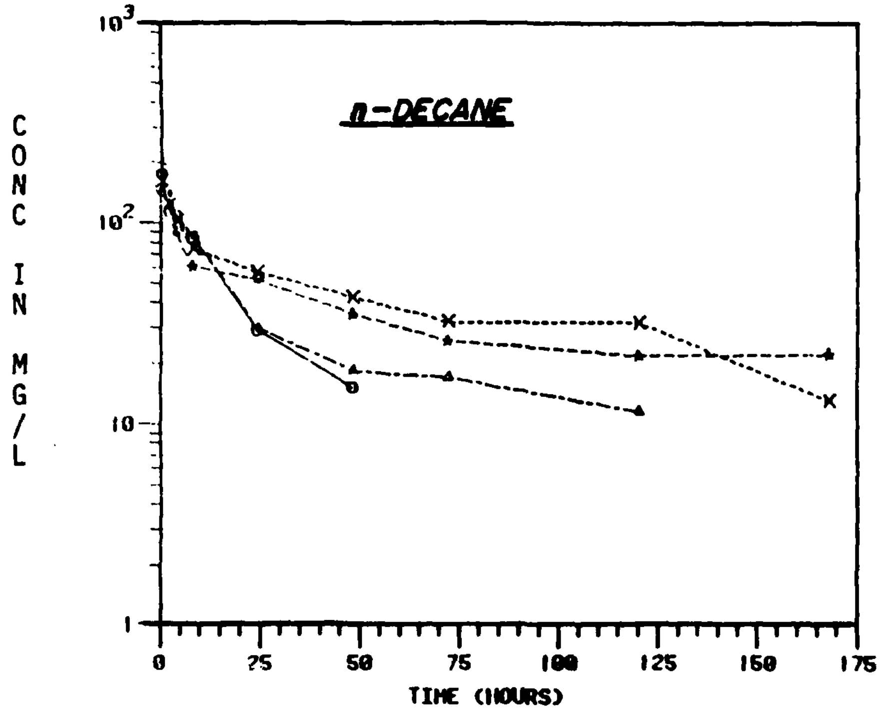


Figure D-23. 7-28-82 Range Point Quiescent Fate Screen, JP-4

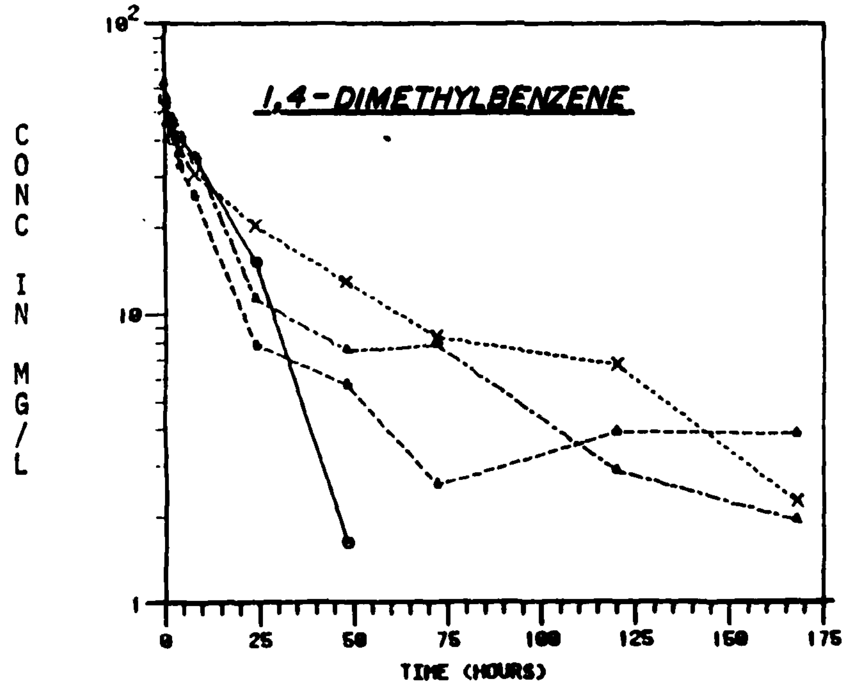


Figure D-24. 7-28-82 Range Point Quiescent Fate Screen, JP-4

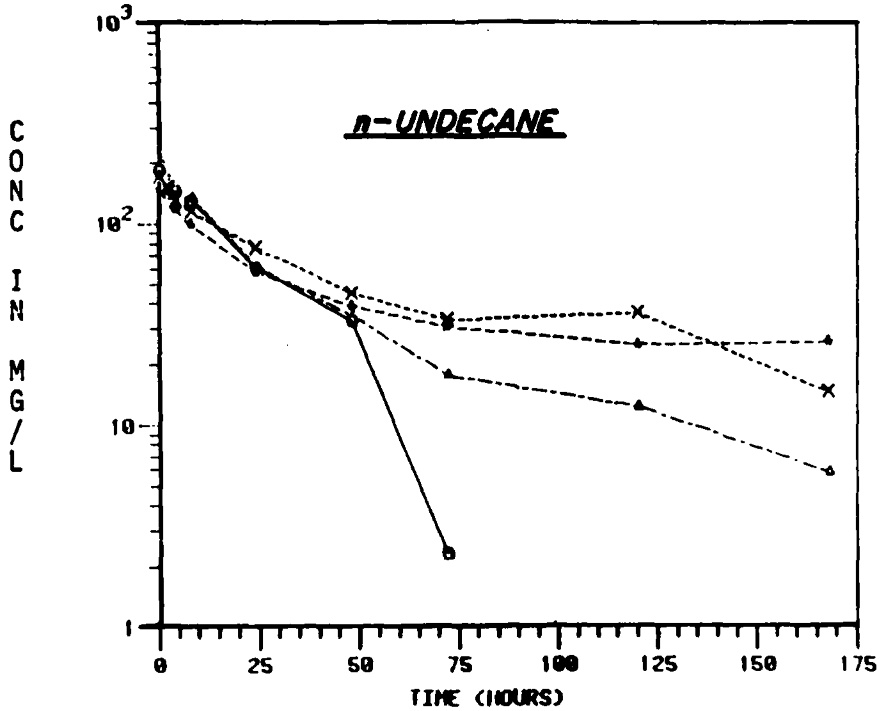


Figure D-25. 7-28-82 Range Point Quiescent Fate Screen, JP-4

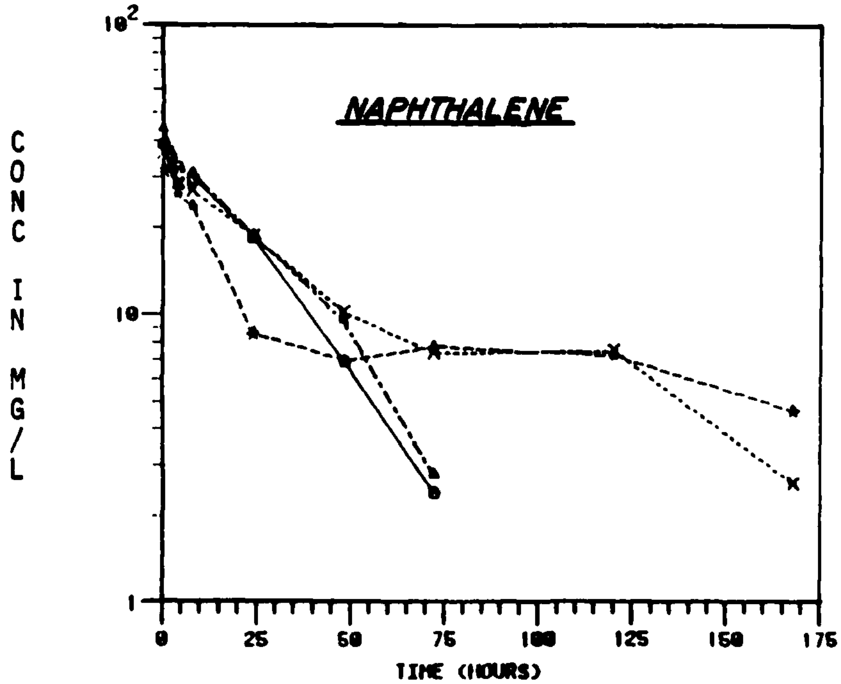


Figure D-26. 7-28-82 Range Point Quiescent Fate Screen, JP-4

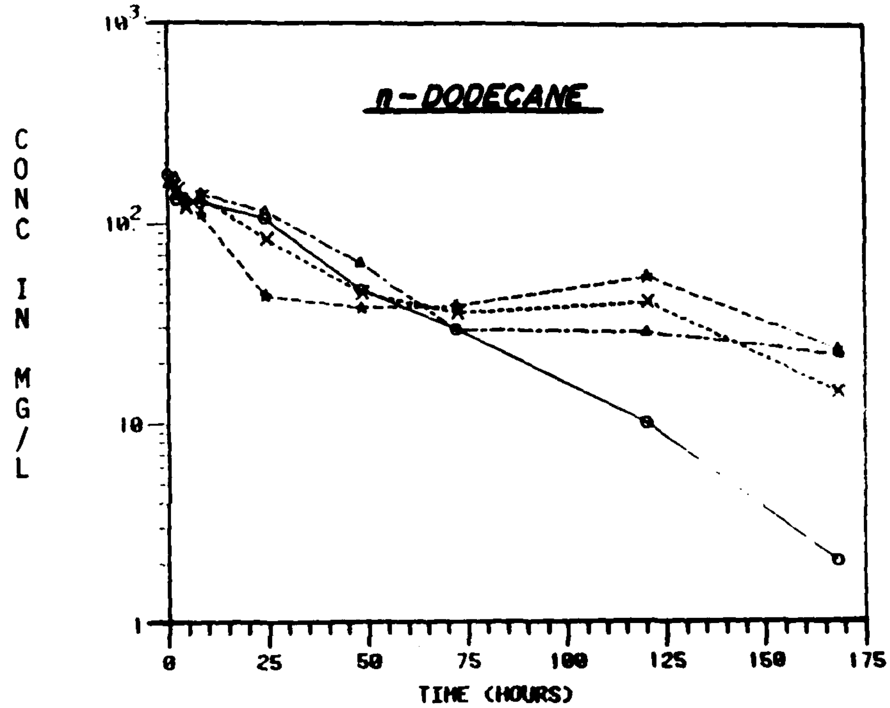


Figure D-27. 7-28-82 Range Point Quiescent Fate Screen, JP-4

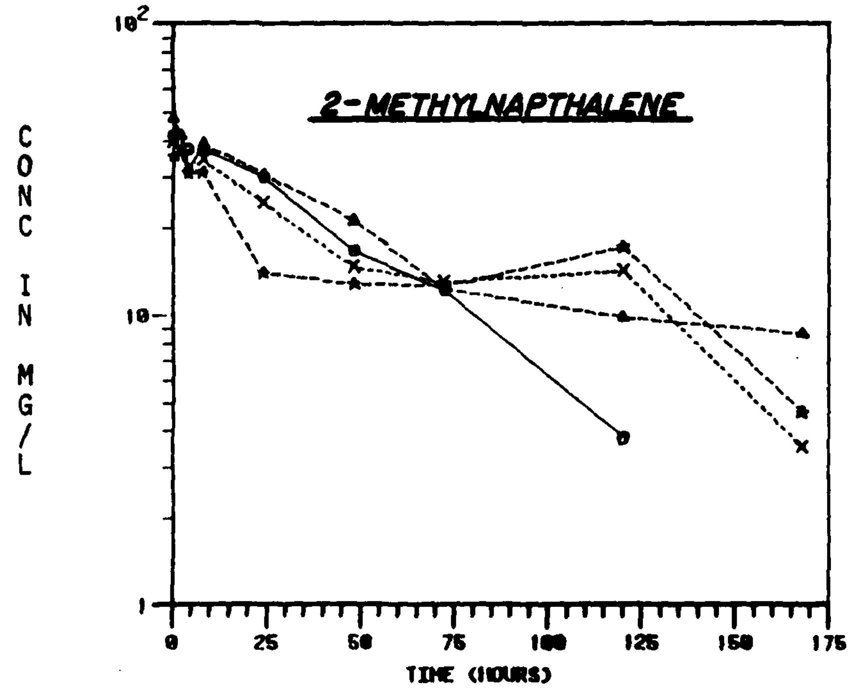


Figure D-28. 7-28-82 Range Point Quiescent Fate Screen, JP-4

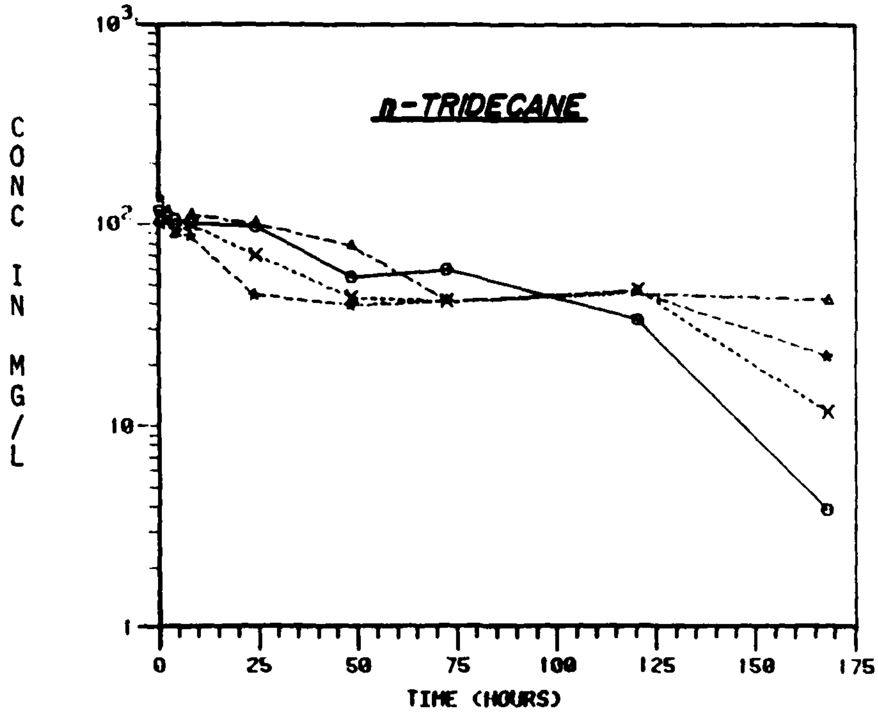


Figure D-29. 7-28-82 Range Point Quiescent Fate Screen, JP-4

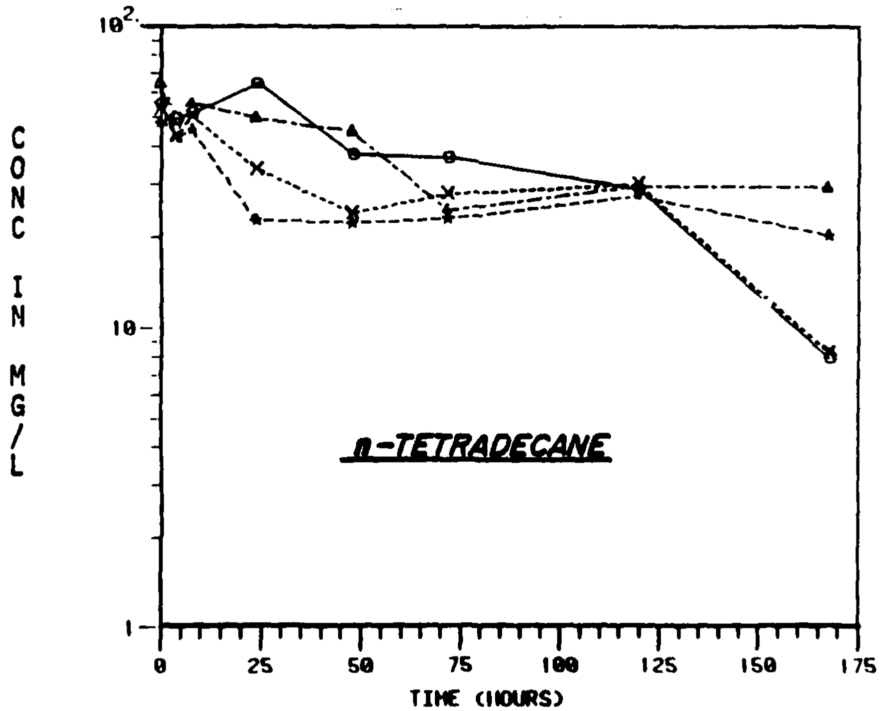


Figure D-30. 7-28-82 Range Point Quiescent Fate Screen, JP-4

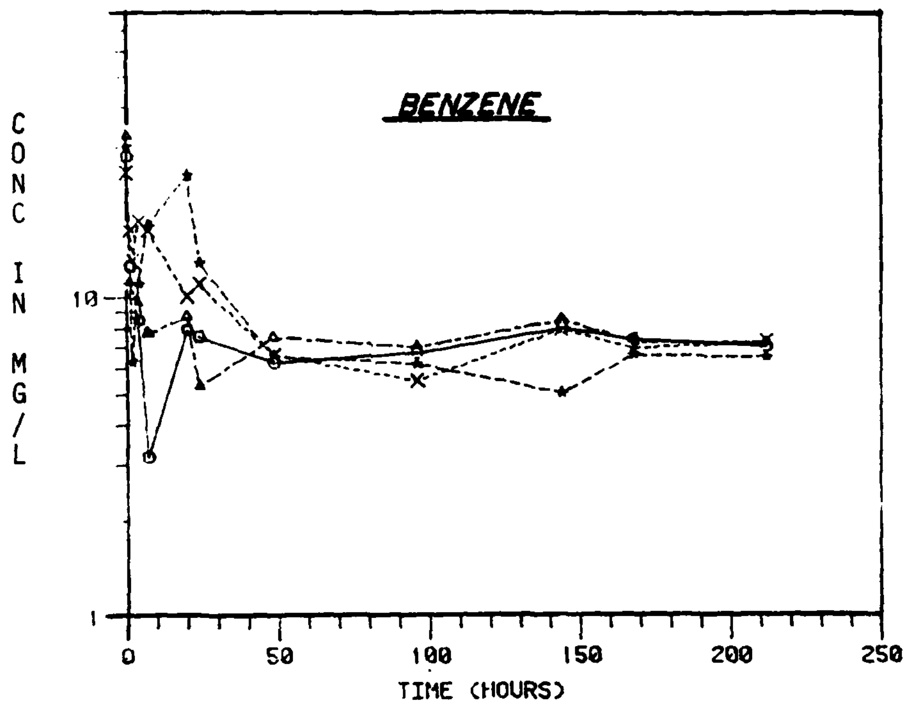


Figure D-31. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

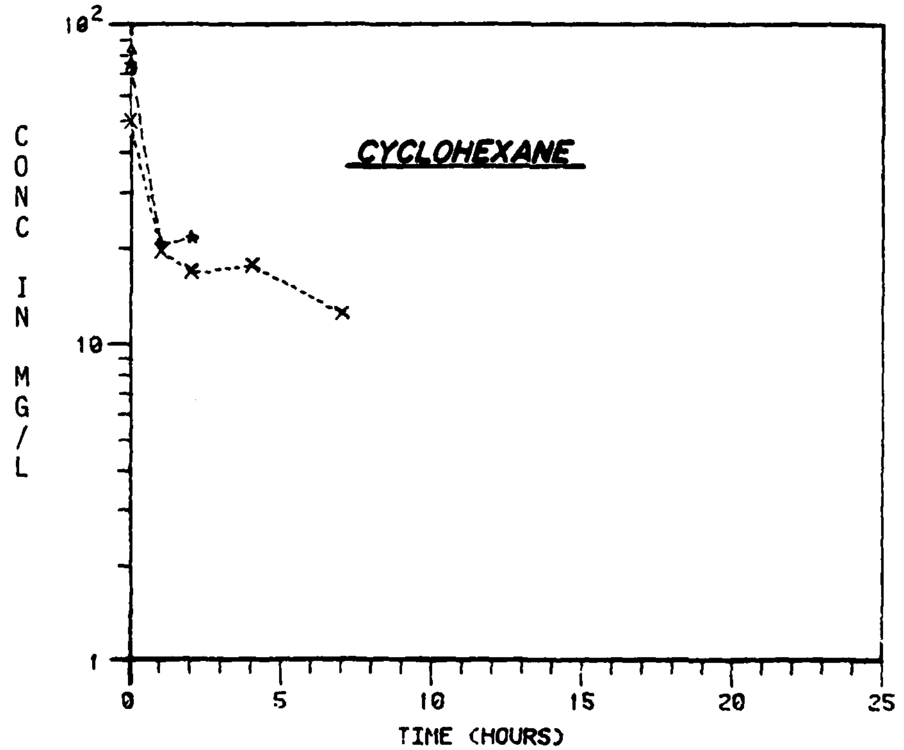


Figure D-32. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

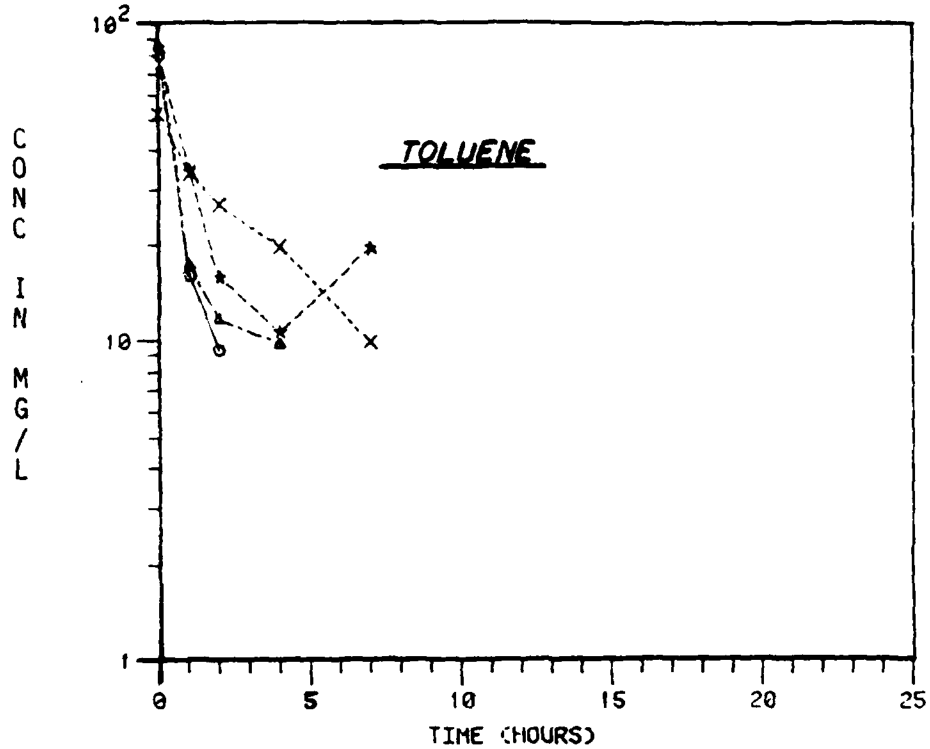


Figure D-33. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

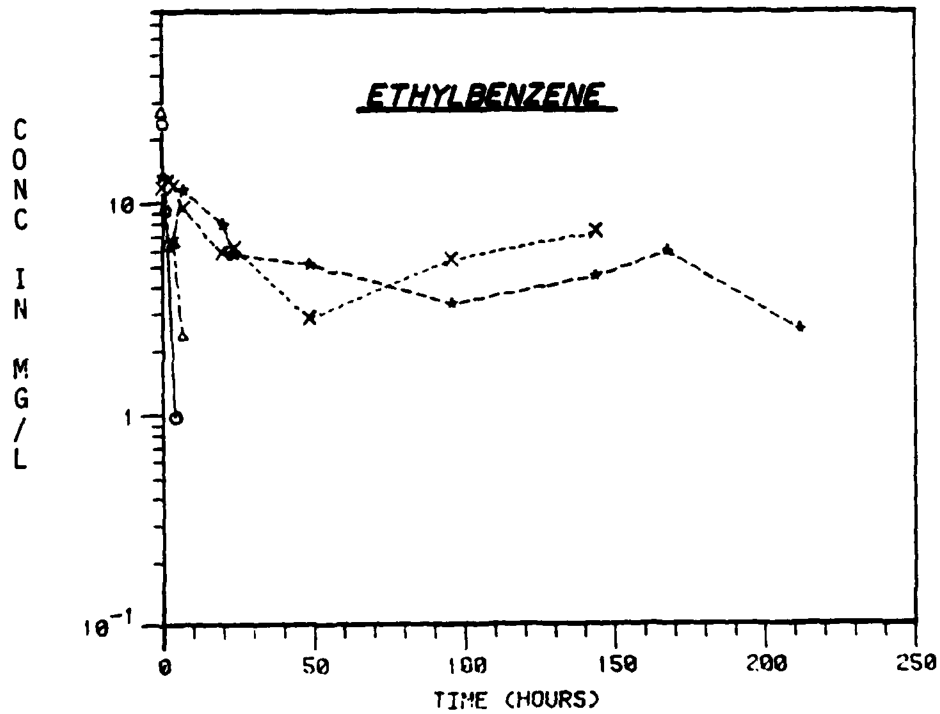


Figure D-34. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

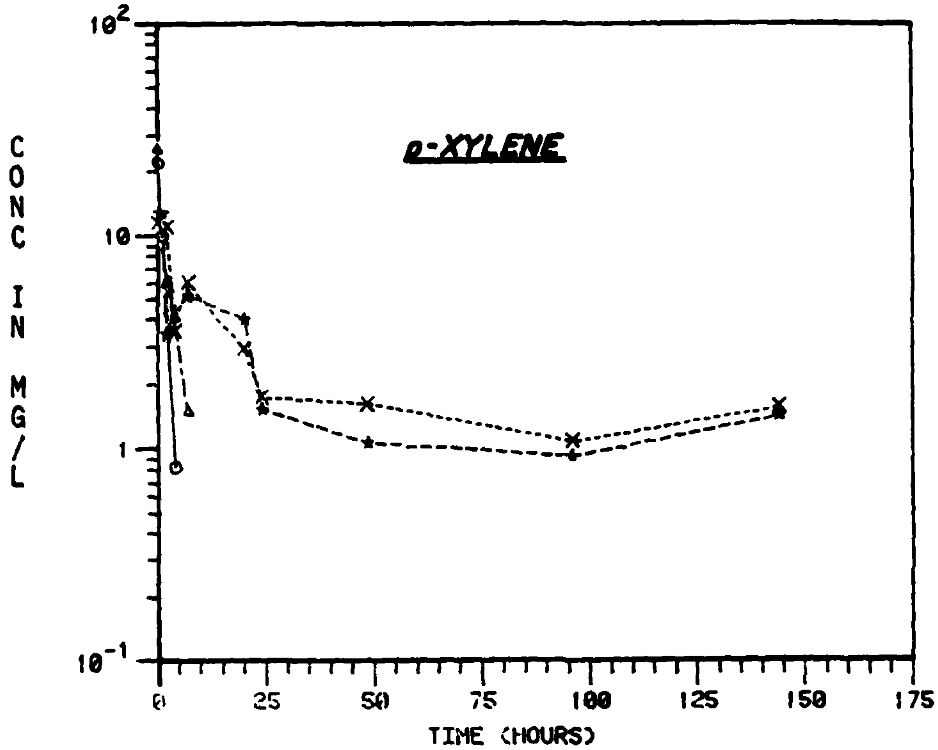


Figure D-35. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

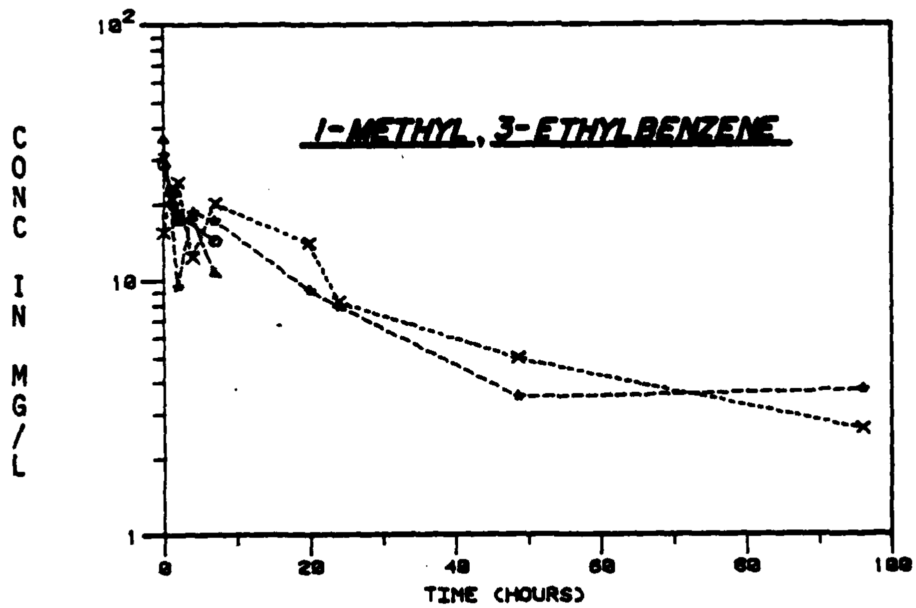


Figure D-36. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

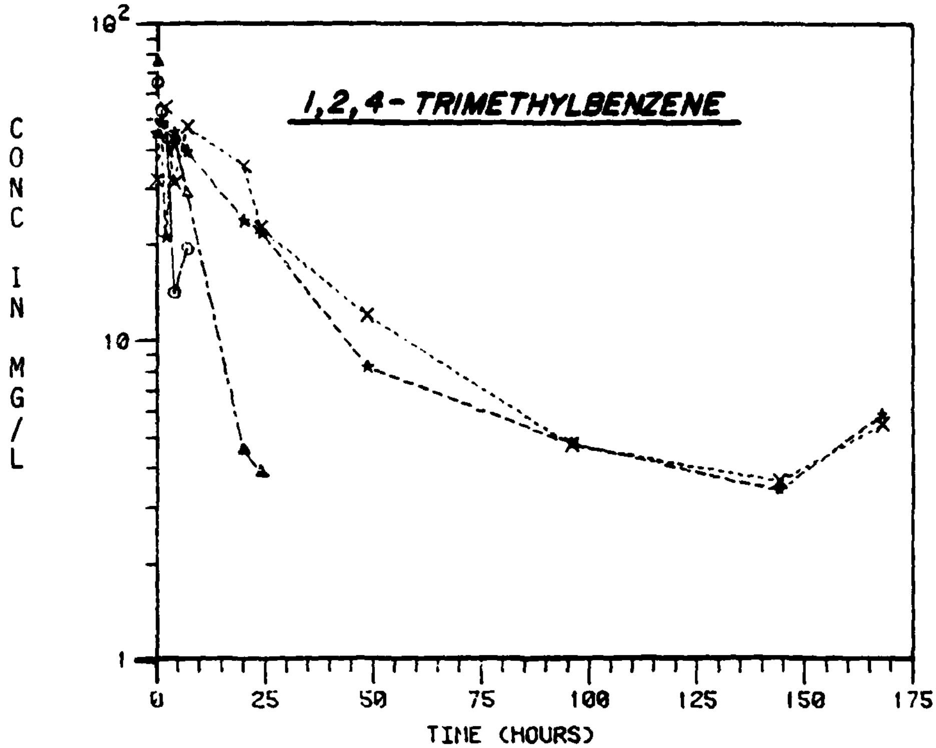


Figure D-37. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

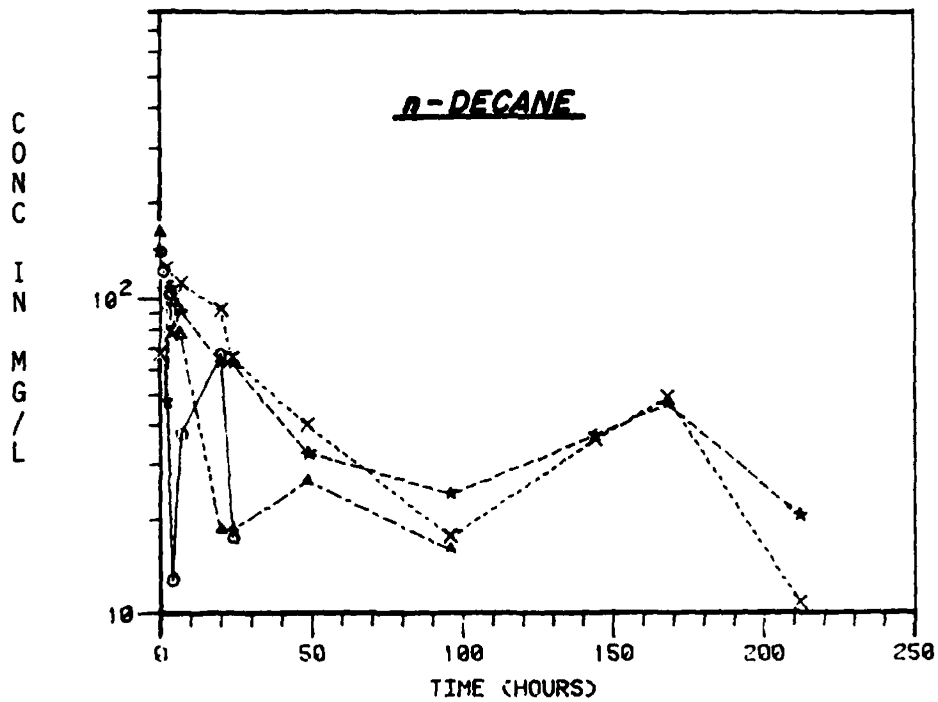


Figure D-38. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

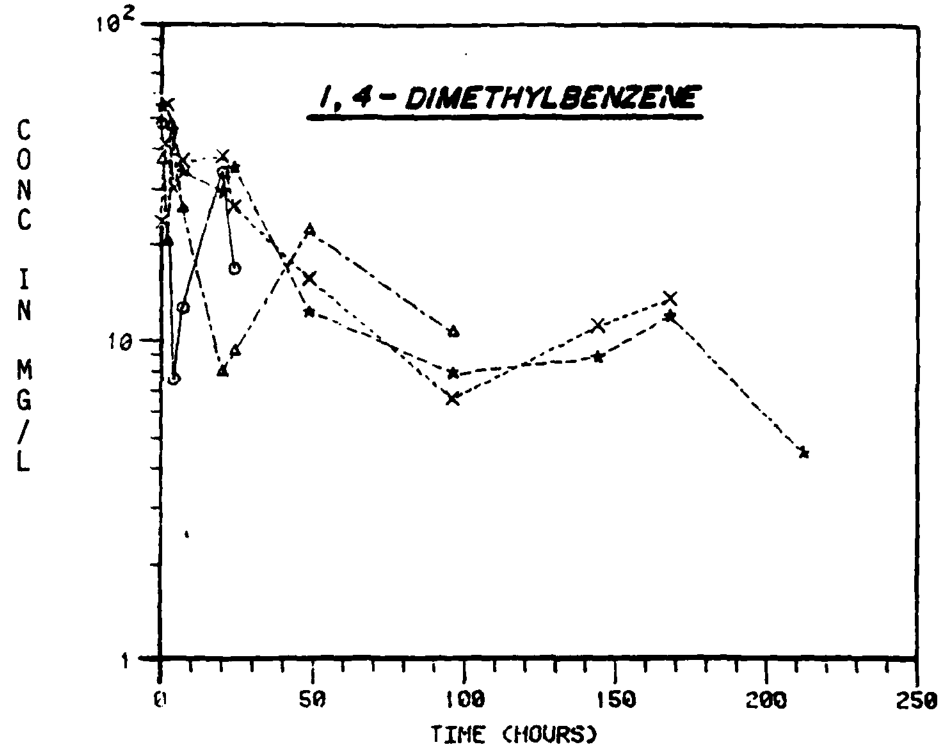


Figure D-39. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

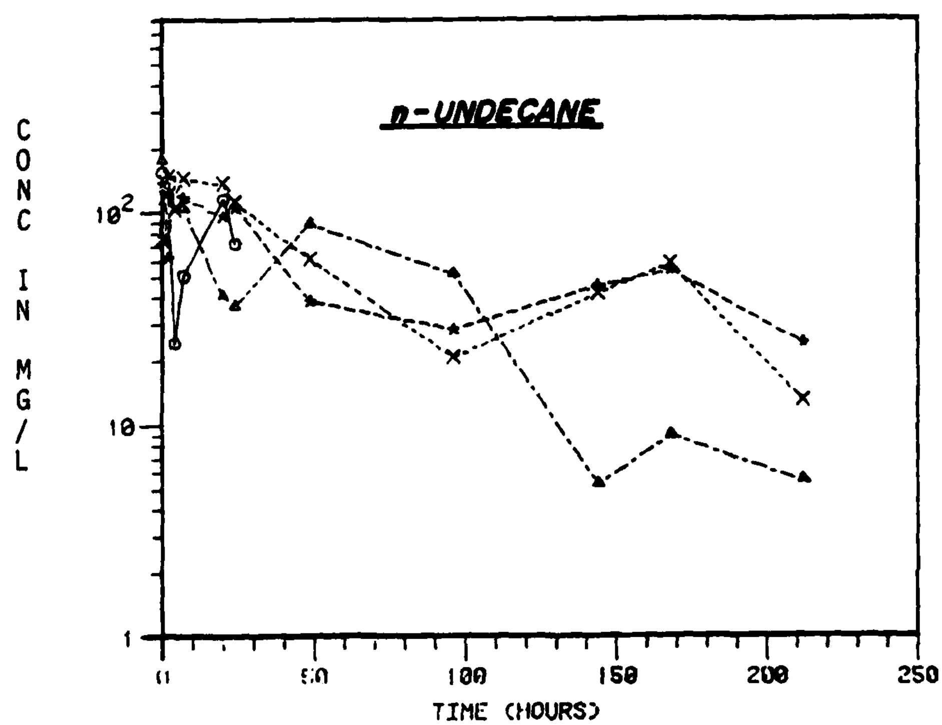


Figure D-40. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

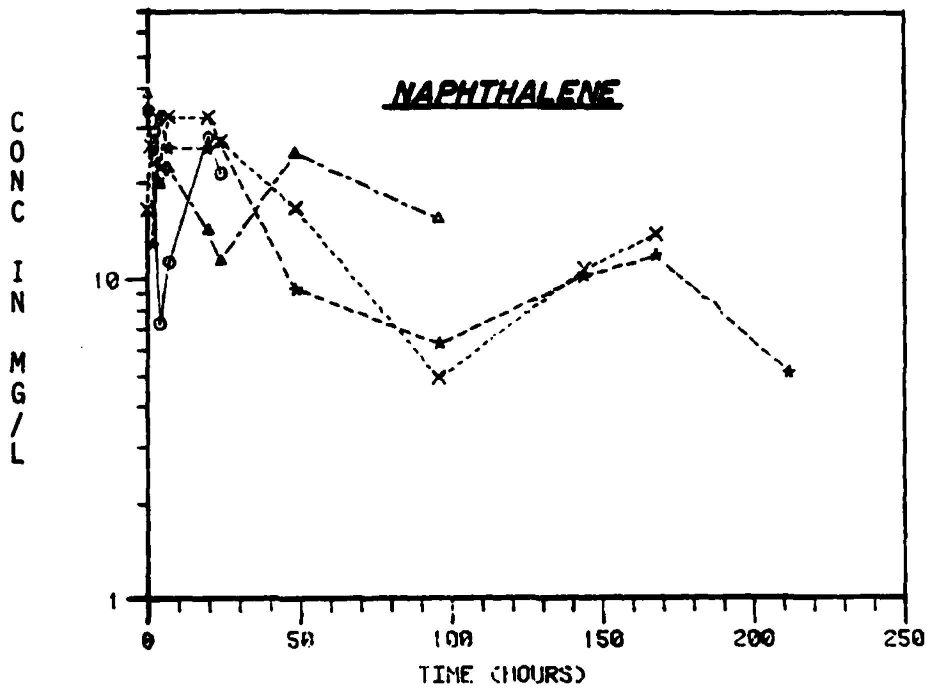


Figure D-41. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

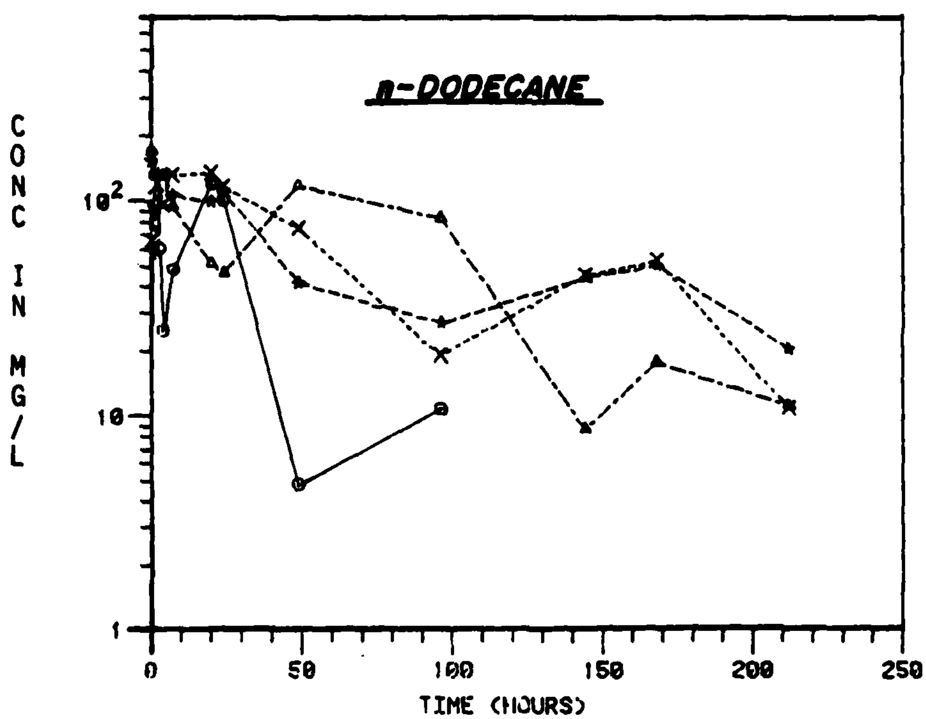


Figure D-42. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

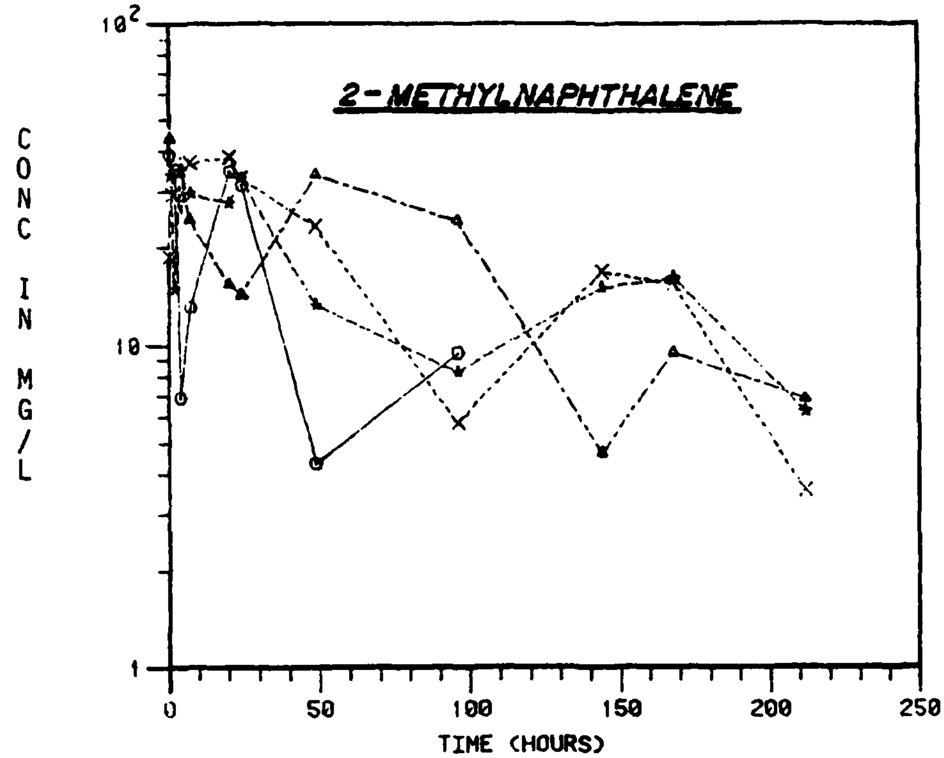


Figure D-43. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

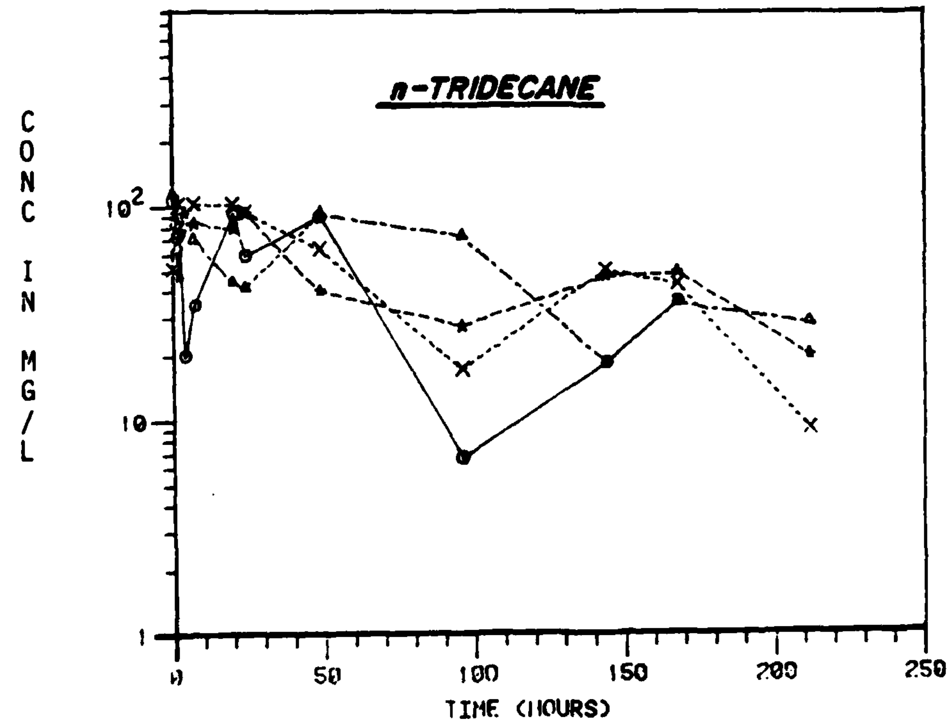


Figure D-44. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

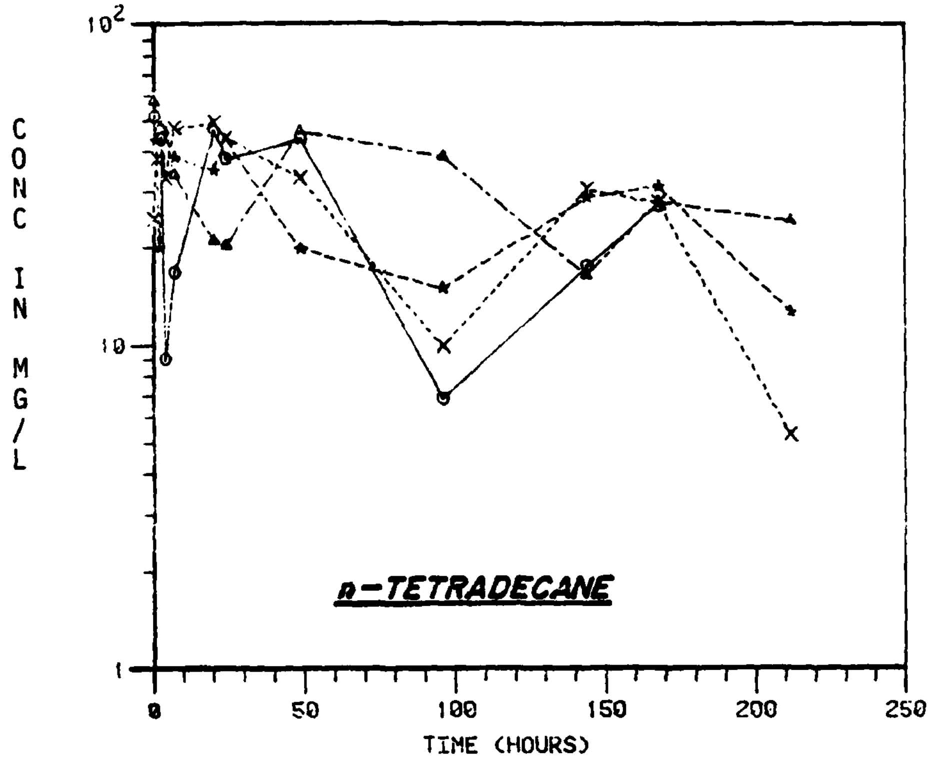


Figure D-45. 9-25-82 Escambia River Quiescent Fate Screen, JP-4

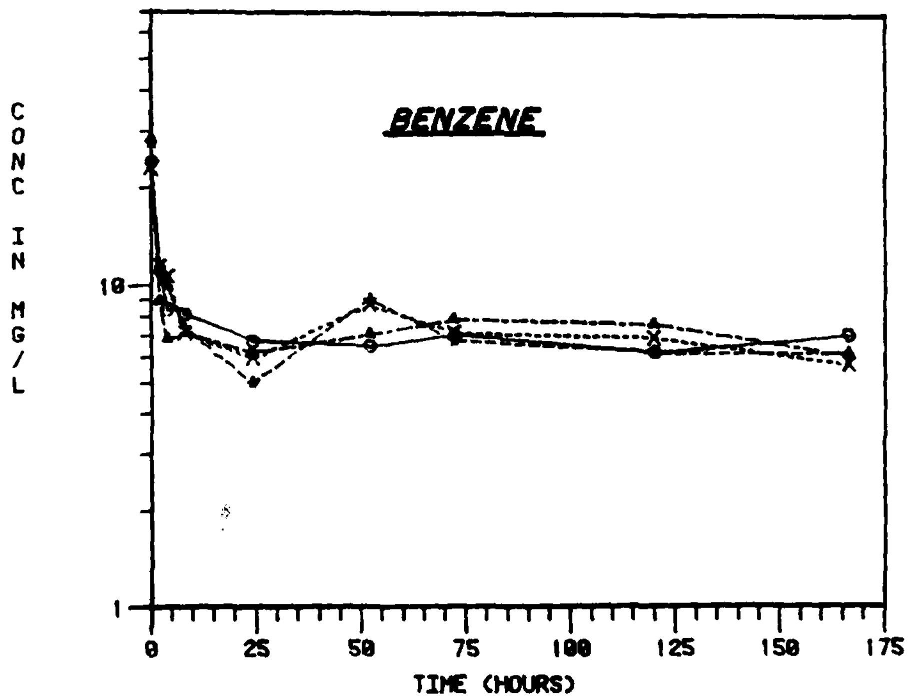


Figure D-46. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

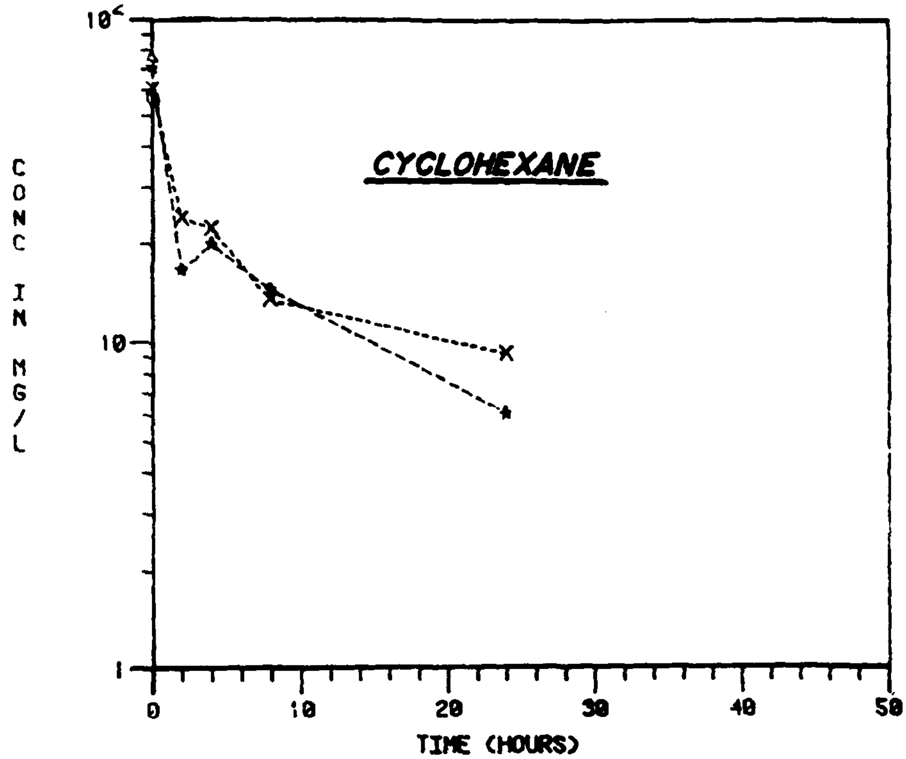


Figure D-47. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

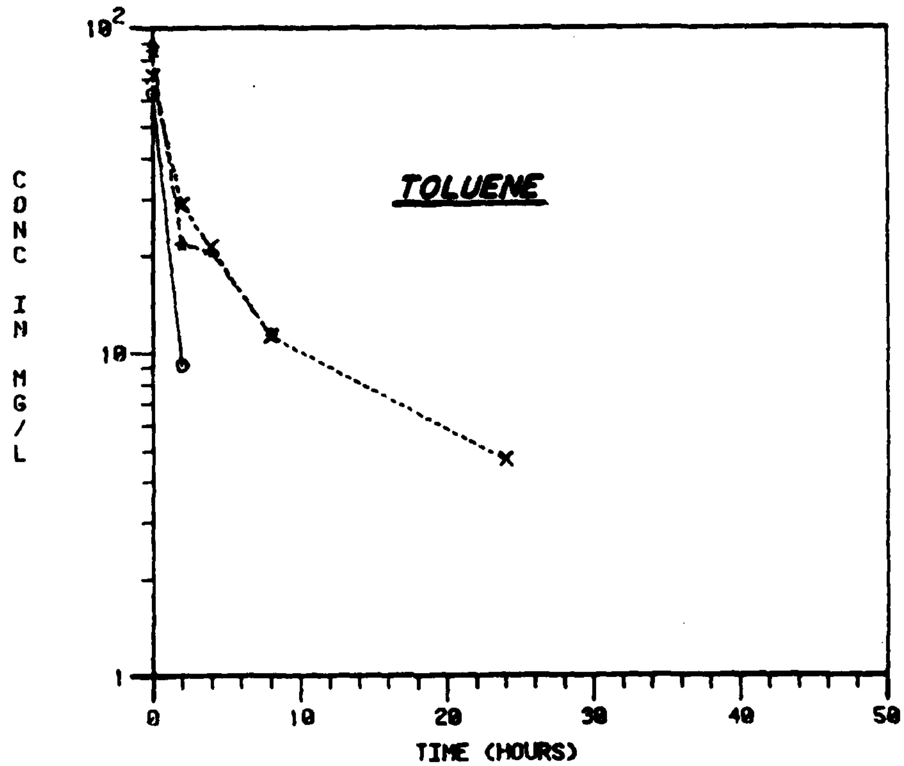


Figure D-48. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

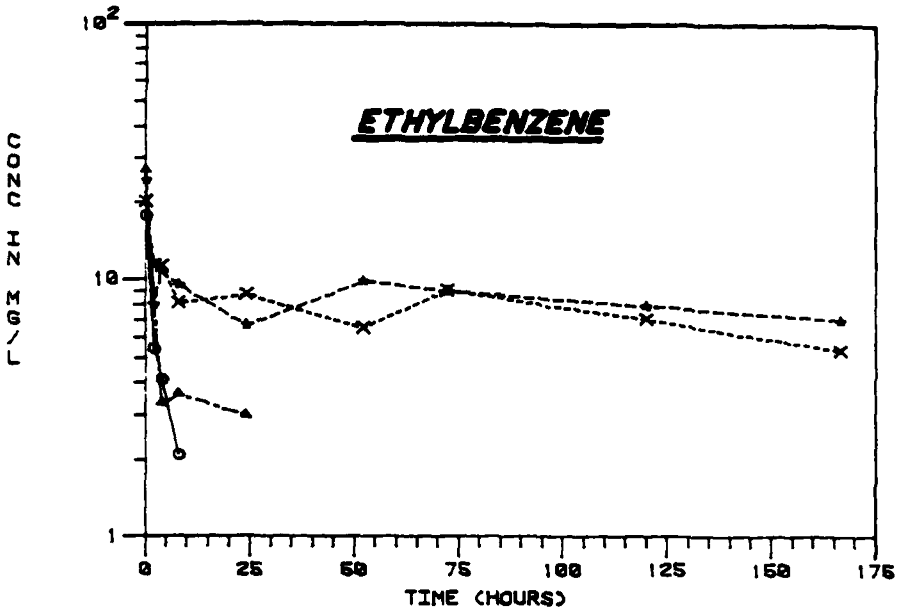


Figure D-49. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

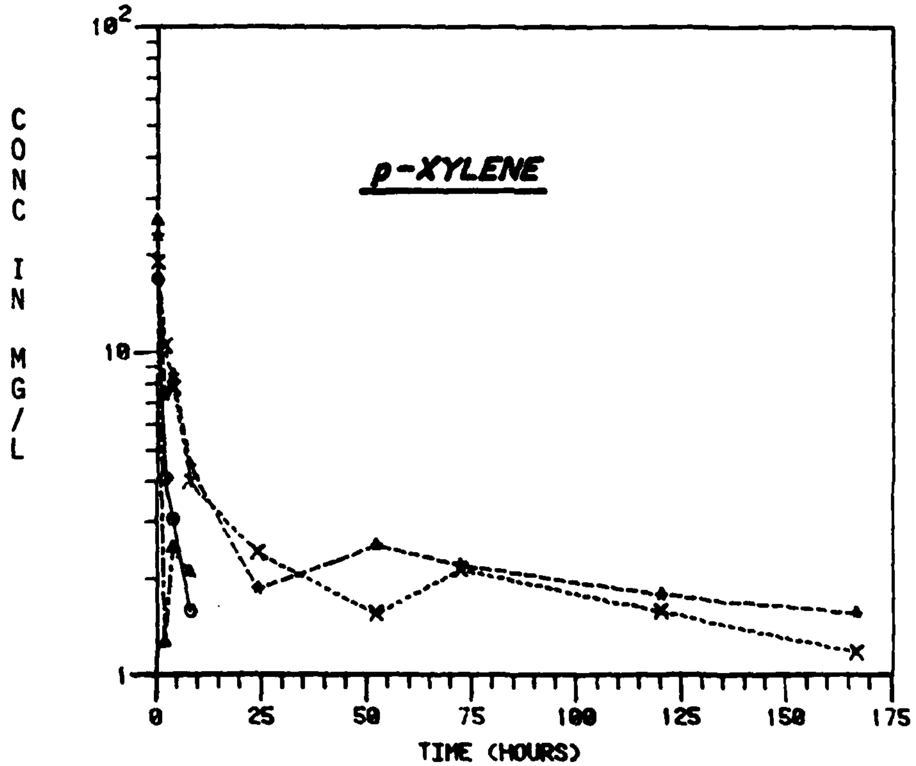


Figure D-50. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

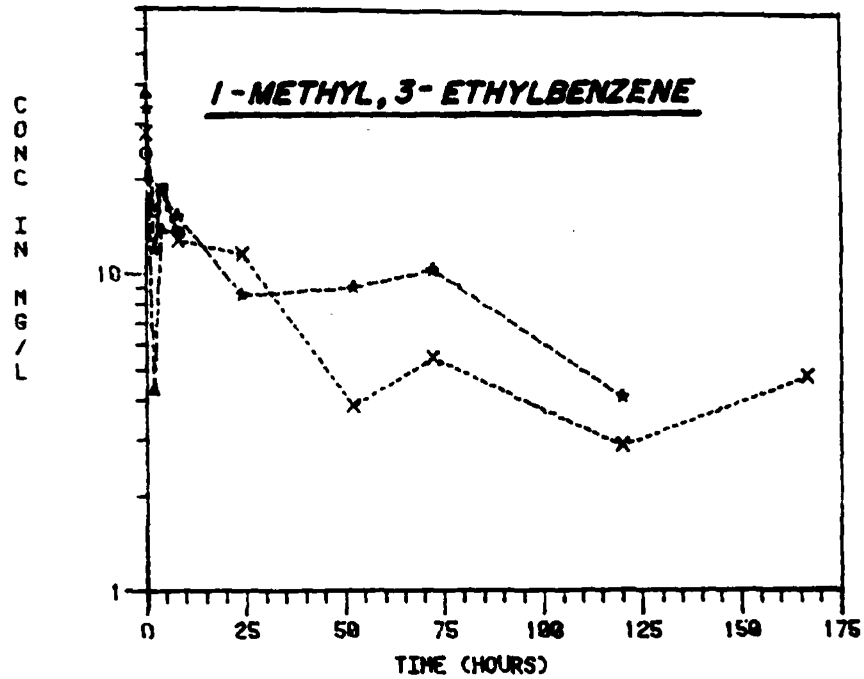


Figure D-51. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

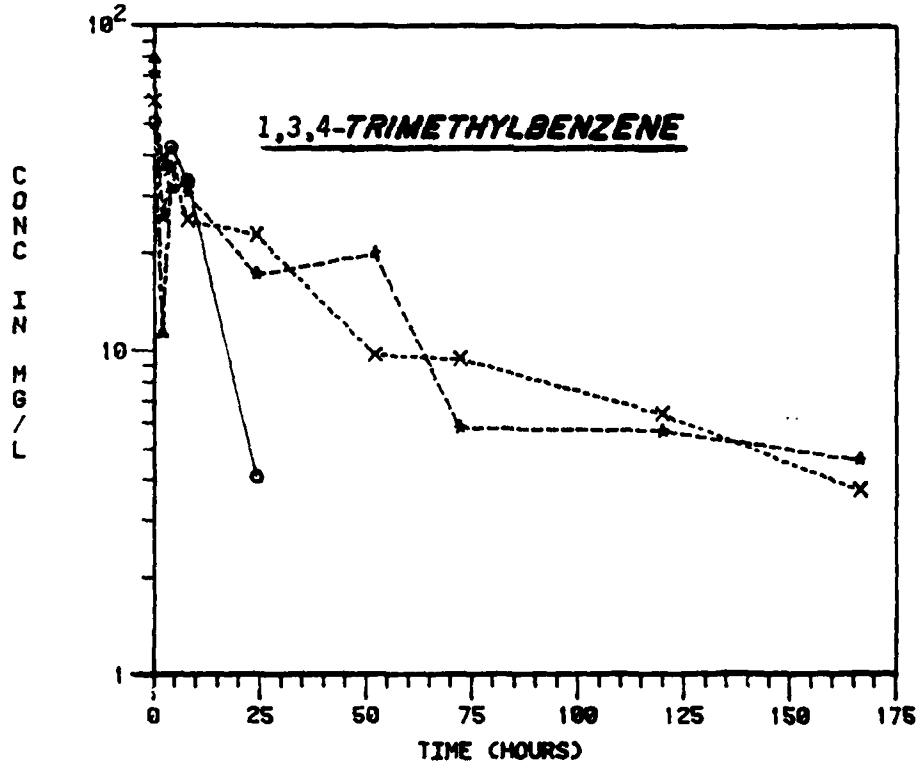


Figure D-52. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

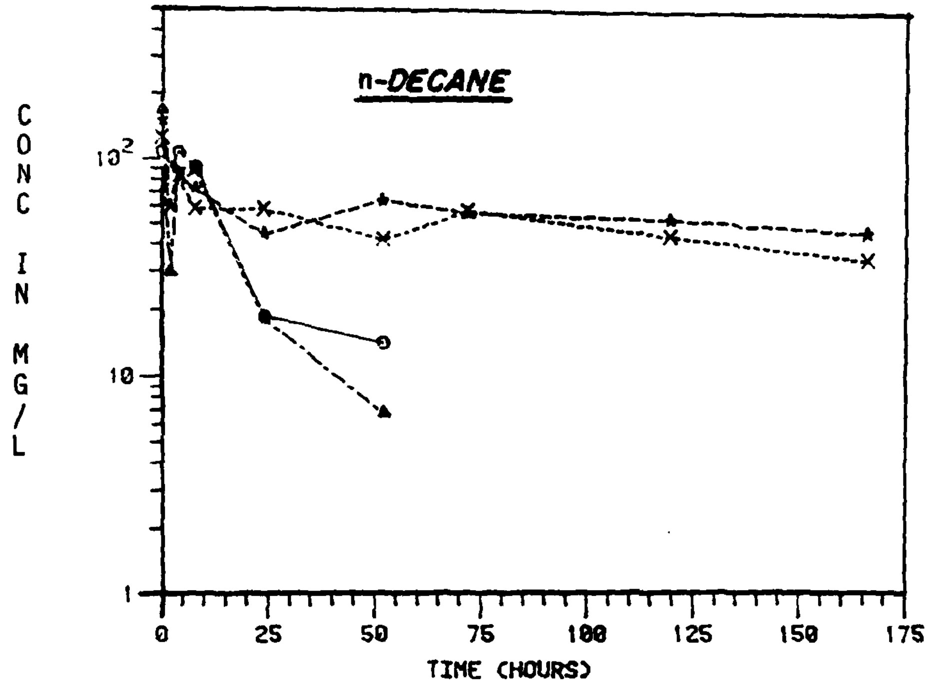


Figure D-53. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

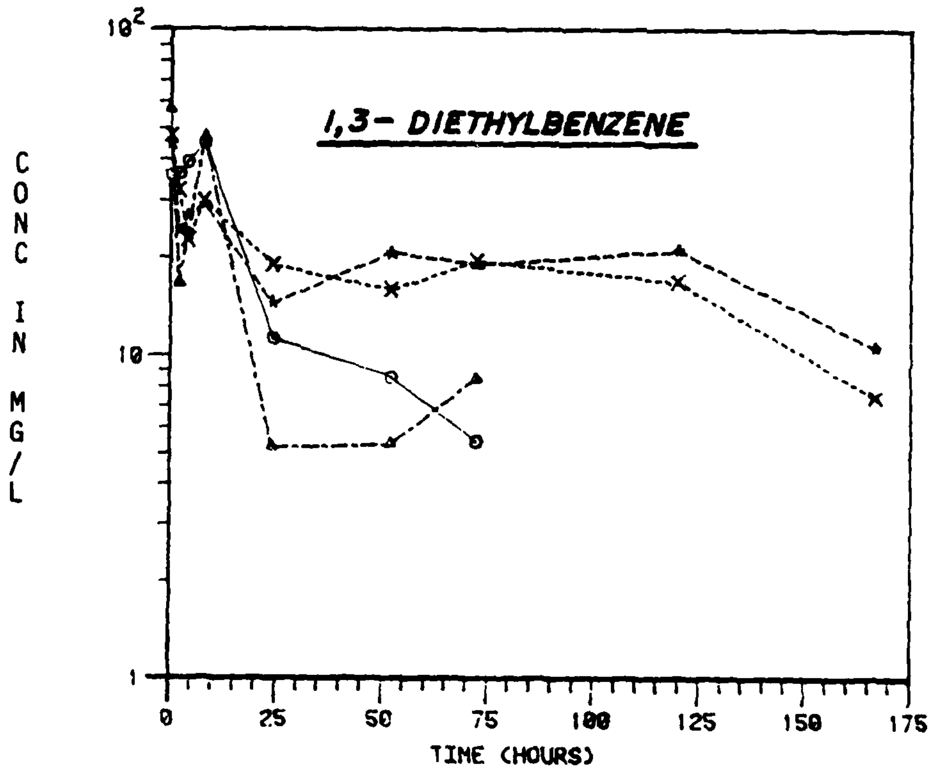


Figure D-54. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

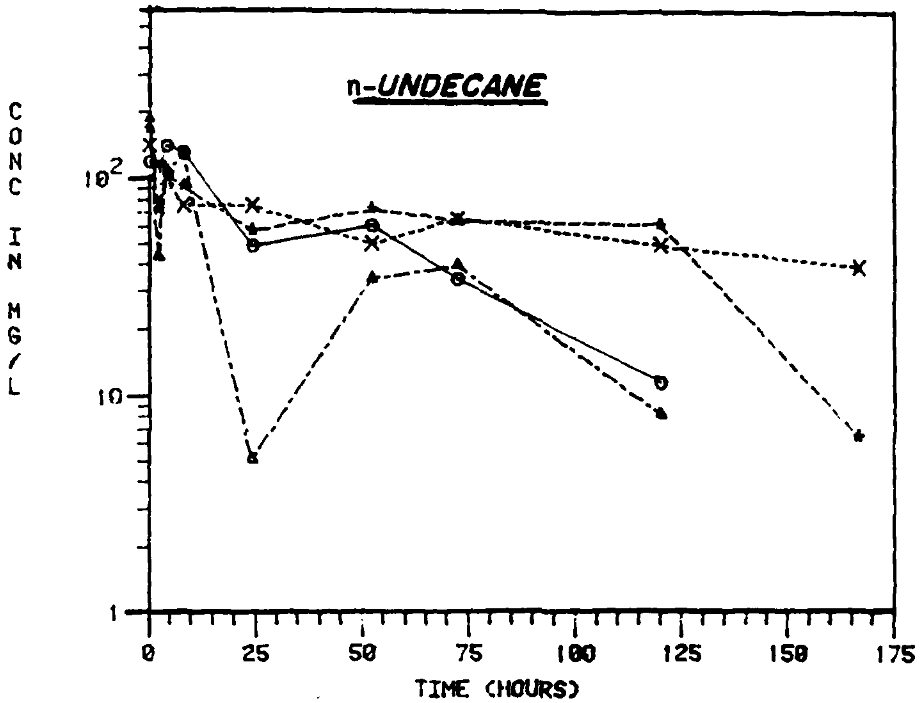


Figure D-55. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

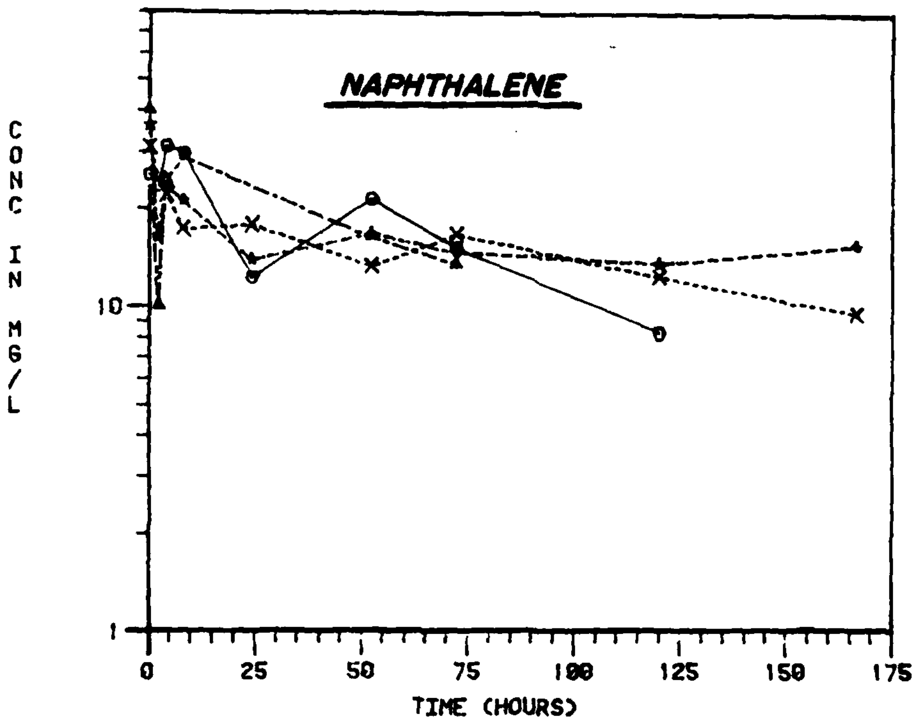


Figure D-56. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

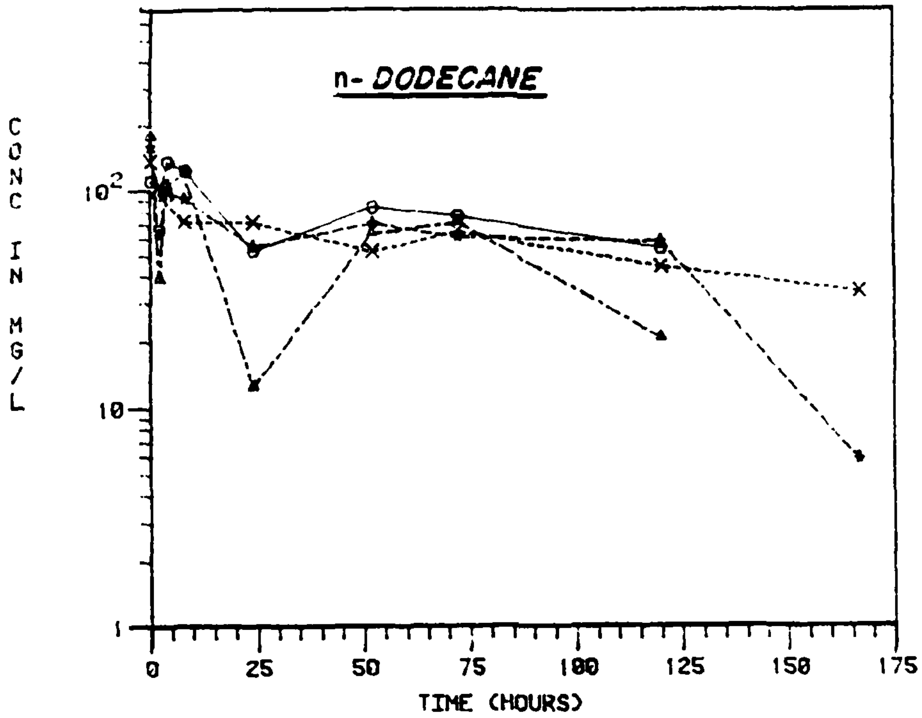


Figure D-57. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

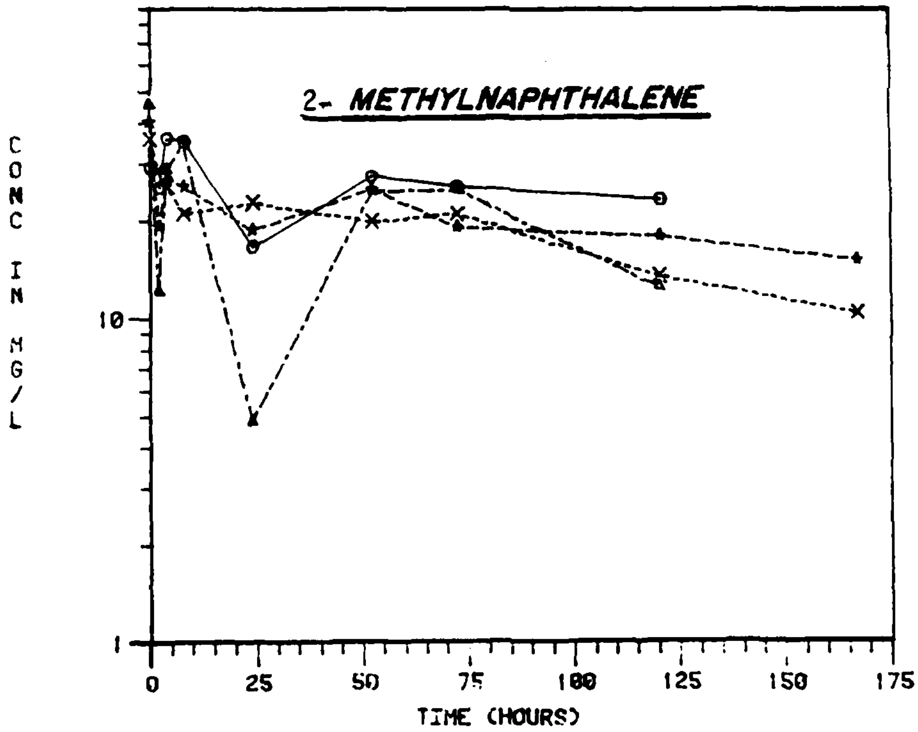


Figure D-58. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

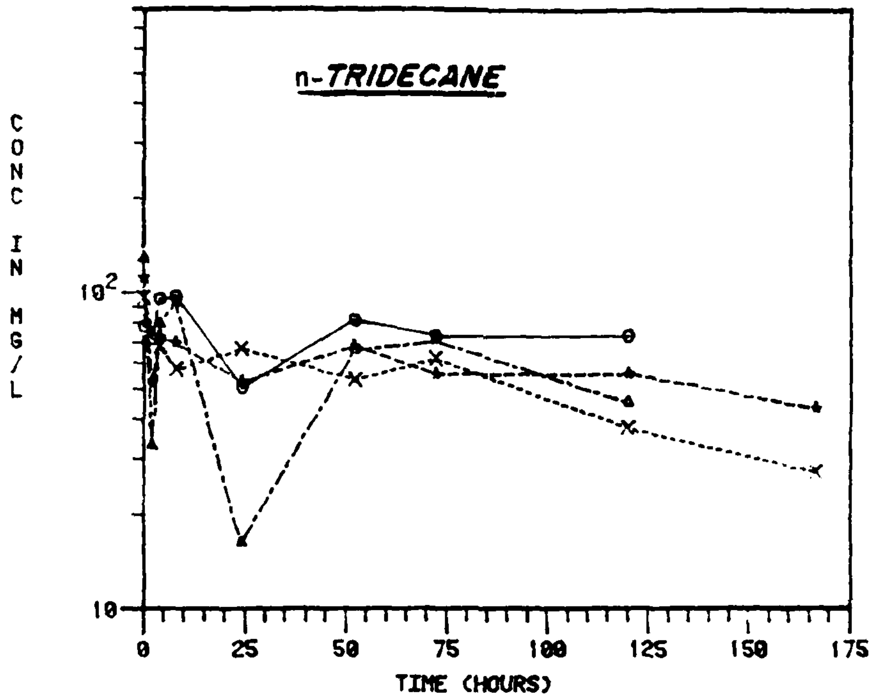


Figure D-59. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

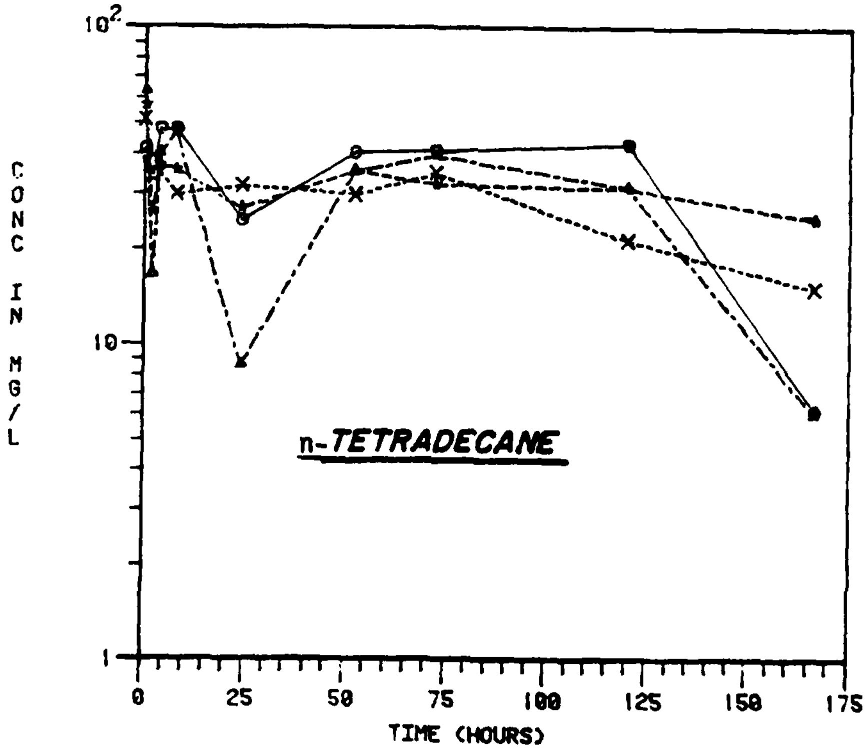


Figure D-60. 10-15-82 Bayou Chico Quiescent Fate Screen, JP-4

APPENDIX E

DATA TABLES - MODEL FUEL

4-5-82 - 8-18-82

TABLE E-1. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 4-5-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	28.66	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	18.16	4.24	2.00	1.20	0.10	ND	ND	ND	ND	0.95	-0.256
n-Heptane	1.40	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	0.68	0.12	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	217.48	139.64	124.40	132.76	71.32	51.32	22.72	4.64	2.36	0.98	-0.040
Ethylcyclohexane	1.56	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene	58.92	35.80	31.88	34.12	17.48	12.44	5.44	1.24	ND	0.98	-0.042
Cumene	20.64	10.96	9.48	9.64	4.36	2.80	1.16	ND	ND	0.94	-0.046
1,3,5-Trimethylbenzene	22.08	12.68	11.96	11.12	4.76	8.36	5.80	5.76	6.52	0.41	-0.008
Indan	38.52	27.96	26.80	32.28	19.16	20.24	13.56	7.08	5.60	0.95	-0.017
Naphthalene	47.44	36.92	36.32	45.16	32.04	39.52	39.52	30.48	23.44	0.81	-0.006
2-Methylnaphthalene	12.80	10.60	9.96	12.08	9.96	12.08	8.56	10.44	4.68	0.58	-0.006
2,3-Dimethylnaphthalene	4.24	3.88	3.88	4.20	3.16	3.88	2.96	2.20	2.04	0.88	-0.007

ND - non-detectable
*One injection only

TABLE E-2. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 4-5-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	45	r^2	Slope
Hexane	13.44	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	27.08	3.28	1.88	0.10	ND	ND	ND	ND	ND	0.97	-0.580
n-Heptane	1.52	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	0.64	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	240.68	125.36	119.00	94.44	73.88	51.60	13.88	3.96	1.56	0.98	-0.043
Ethylcyclohexane	1.60	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene	64.48	32.56	30.65	24.52	18.60	12.52	3.32	1.00	ND	0.97	-0.045
Cumene	22.32	10.08	9.04	6.88	4.90	2.88	0.76	ND	ND	0.93	-0.050
1,3,5-Trimethylbenzene	23.92	10.84	11.12	9.80	10.20	9.08	5.24	4.72	5.28	0.69	-0.011
Indan	41.32	25.76	24.88	23.48	21.56	22.56	8.12	5.44	4.32	0.92	-0.019
Naphthalene	49.12	34.60	31.88	35.64	36.32	43.72	19.52	17.76	16.76	0.74	-0.009
2-Methylnaphthalene	13.00	10.00	8.96	9.96	9.76	11.08	5.00	4.40	3.84	0.83	-0.010
2,3-Dimethylnapthalene	4.04	3.44	3.44	3.40	3.40	3.88	2.00	1.92	1.72	0.82	-0.008

ND = non-detectable
*One injection only

TABLE E-3. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 4-5-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
		Concentration (mg/ℓ)										
Hexane		7.38	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		10.24	5.88	2.40	0.11	ND	ND	ND	ND	ND	0.90	-0.504
Methylcyclohexane		0.36	0.16	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		111.48	170.00	130.64	125.88	82.80	41.88	18.76	5.84	1.44	0.99	-0.041
Ethylcyclonexane		0.96	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		30.52	44.20	34.00	31.04	19.40	10.64	4.52	1.36	ND	0.99	-0.040
Cumene		10.88	13.56	9.92	3.44	4.68	2.36	0.92	ND	ND	0.99	-0.047
1,3,5-Trimethylbenzene		10.52	16.36	12.12	10.24	6.72	8.08	6.88	6.56	5.00	0.70	-0.008
Indan		19.56	35.76	28.44	29.20	21.52	18.00	11.48	6.56	3.20	0.94	-0.019
Naphthalene		23.92	46.68	35.48	41.96	35.52	35.80	29.92	25.44	15.12	0.58	-0.007
2-Methylnaphthalene		6.60	13.08	10.40	11.48	9.68	9.28	7.88	6.24	3.48	0.68	-0.008
2,3-Dimethylnapthalene		2.36	4.80	4.80	4.28	3.68	3.60	3.04	2.72	1.72	0.54	-0.006

ND = non-detectable
*One injection only

TABLE E-4. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 4-5-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
		Concentration (mg/ℓ)										
Hexane		2.16	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		16.12	4.16	2.12	0.10	ND	ND	ND	ND	ND	0.98	-0.542
n-Heptane		0.88	0.12	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane		0.52	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		138.76	135.88	135.04	129.96	72.76	29.96	13.56	5.32	1.12	0.99	-0.044
Ethylcyclohexane		0.96	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		36.88	35.20	35.30	31.84	18.68	7.60	23.00	1.44	ND	0.97	-0.044
Cumene		12.80	10.86	10.36	8.72	4.88	1.96	0.84	ND	ND	1.00	-0.050
1,3,5-Trimethylbenzene		13.36	11.64	11.44	10.16	5.40	5.96	5.76	6.00	4.60	0.65	-0.008
Indan		24.72	27.84	29.04	28.16	20.72	13.4	9.96	7.72	2.72	0.96	-0.020
Naphthalene		31.36	36.32	37.40	38.40	33.12	25.76	22.60	24.48	13.92	0.86	-0.008
2-Methylnaphthalene		9.28	10.36	10.52	10.20	8.92	6.92	5.72	5.72	3.12	0.93	-0.010
2,3-Dimethylnapthalene		3.48	3.64	3.64	3.44	3.16	3.16	2.08	2.40	1.36	0.88	-0.008

ND = non-detectable
*One injection only

TABLE E-5. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 5-19-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	20.03 ±0.95	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	2.53 ±0.06	0.30 ±0.00	0.20 ±0.00	ND	ND	ND	ND	ND	ND	0.87	-0.551
n-Heptane	0.17 ±0.06	0.10 ±0.00	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	0.63 ±0.06	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	16.63 ±0.68	12.77 ±0.40	11.27 ±0.15	7.70 ±0.17	4.73 ±0.38	2.37 ±0.15	1.17 ±0.06	0.30 ±0.00	0.09 ±0.01	0.99	-0.046
Ethylcyclohexane	0.20 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene	5.33 ±0.25	3.77 ±0.06	3.37 ±0.06	2.23 ±0.06	1.33 ±0.12	0.67 ±0.06	0.30 ±0.00	0.10 ±0.01	ND	0.98	-0.046
Cumene	1.97 ±0.15	1.20 ±0.00	1.00 ±0.00	0.60 ±0.00	0.30 ±0.00	0.13 ±0.06	ND	ND	ND	0.93	-0.071
1,3,5-Trimethylbenzene	1.63 ±0.06	1.10 ±0.00	0.97 ±0.06	0.60 ±0.00	0.40 ±0.00	0.20 ±0.00	0.20 ±0.00	0.07 ±0.00	ND	0.89	-0.036
Indan	3.53 ±0.35	3.13 ±0.06	3.07 ±0.15	2.33 ±0.06	1.73 ±0.12	1.30 ±0.00	1.10 ±0.00	0.60 ±0.00	0.27 ±0.06	0.97	-0.022
Naphthalene	4.23 ±0.21	3.73 ±0.12	4.10 ±0.17	3.53 ±0.12	3.30 ±0.17	2.73 ±0.06	2.70 ±0.00	1.43 ±0.06	0.67 ±0.15	0.91	-0.015
2-Methylnaphthalene	1.30 ±0.10	1.07 ±0.06	1.117 ±0.06	1.10 ±0.17	0.97 ±0.06	0.77 ±0.06	0.70 ±0.00	0.50 ±0.00	0.27 ±0.06	0.93	-0.013
2,3-Dimethylnaphthalene	0.43 ±0.06	0.30 ±0.00	0.37 ±0.06	0.30 ±0.00	0.37 ±0.06	0.30 ±0.00	0.23 ±0.06	0.20 ±0.00	0.10 ±0.00	0.82	-0.010

ND = non-detectable

TABLE E-6. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 5-19-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

		Concentration (mg/ℓ)									
Compound	Time (Hours) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	23.73 ±2.74	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	2.57 ±0.21	0.33 ±0.06	0.20 ±0.00	0.10 ±0.00	ND	ND	ND	ND	ND	0.80	-0.318
n-Heptane	0.13 ±0.06	1.10 0.00	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	0.63 ±0.06	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	16.37 ±1.21	13.97 ±0.98	9.50 ±0.17	5.97 ±0.29	4.67 ±0.15	2.10 ±0.10	1.13 ±0.12	0.33 ±0.06	0.09 ±0.01	0.99	-0.045
Ethylcyclohexane	0.17 ±0.06	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene	5.23 ±0.38	4.13 ±0.32	2.83 ±0.06	1.70 ±0.10	1.40 ±0.00	0.60 ±0.00	0.30 ±0.00	0.09 ±0.01	ND	0.97	-0.046
Cumene	1.93 ±0.12	1.27 ±0.12	0.83 ±0.06	0.47 ±0.06	0.33 ±0.00	0.10	ND	ND	ND	0.94	-0.0.75
1,3,5-Trimethylbenzene	1.53 ±0.12	1.17 ±0.12	0.80 ±0.00	0.47 ±0.06	0.40 ±0.00	0.20 ±0.00	ND	ND	ND	0.88	-0.051
Indan	3.13 ±0.21	3.52 ±0.72	2.60 ±0.00	1.73 ±0.12	1.87 ±0.06	1.15 ±0.06	0.87 ±0.60	0.50 ±0.06	0.27 ±0.06	0.96	-0.022
Naphthalene	3.73 ±0.21	4.07 ±0.31	3.53 ±0.06	2.60 ±0.20	3.37 ±0.06	2.40 ±0.10	2.17 ±0.15	0.50 ±0.00	ND	0.82	0.021
2-Methylnaphthalene	1.17 ±0.06	1.23 ±0.06	1.07 ±0.06	0.73 ±0.06	1.00 ±0.00	0.70 ±0.00	0.63 ±0.00	0.30 ±0.00	0.09 ±0.01	0.89	-0.020
2,3-Dimethylnaphthalene	0.40 ±0.00	0.40 ±0.00	0.40 ±0.00	0.30 ±0.00	0.40 ±0.00	0.30 ±0.00	0.30 ±0.00	0.20 ±0.00	0.10 ±0.00	0.86	-0.011

ND = non-detectable

TABLE E-7. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 5-19-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		22.8 ±3.44	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		2.80 ±0.36	4.00 ±0.00	2.00 ±0.00	1.00 ±0.00	ND	ND	ND	ND	ND	0.83	-0.332
n-Heptane		0.17 ±0.06	0.10 ±0.00	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane		0.70 ±0.10	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		18.43 ±1.89	14.67 ±0.76	11.03 ±0.40	8.30 ±0.95	5.47 ±0.25	2.53 ±0.15	1.20 ±0.10	0.37 ±0.06	0.10 ±0.01	0.99	-0.045
Ethylcyclohexane		0.20	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		5.77 ±0.55	4.30 ±0.17	3.37 ±0.15	2.53 ±0.12	1.57 ±0.06	0.77 ±0.06	0.37 ±0.06	0.11 ±0.01	ND	-	-
Cumene		2.10 ±0.17	1.33 ±0.12	1.03 ±0.06	0.67 ±0.06	0.40 ±0.00	0.20 ±0.00	ND	ND	ND	0.92	-0.059
1,3,5-Trimethylbenzene		1.67 ±0.12	1.20 ±0.00	0.97 ±0.6	0.70 ±0.00	0.43 ±0.06	0.30 ±0.00	0.20 ±0.00	0.07 ±0.00	ND	0.88	-0.051
Indan		3.57 ±0.21	3.40 ±0.10	3.03 ±0.06	2.70 ±0.20	2.07 ±0.06	1.57 ±0.06	1.17 ±0.06	0.67 ±0.06	0.40 ±0.00	0.99	-0.019
Naphthalene		4.40 ±0.17	4.00 ±0.10	3.90 ±0.10	4.20 ±0.20	3.73 ±0.12	3.10 ±0.10	2.73 ±0.12	2.20 ±0.17	1.63 ±0.06	0.98	-0.008
Methylnaphthalene		1.20 ±0.00	1.03 ±0.06	1.03 ±0.06	1.10 ±0.00	1.00 ±0.00	0.80 ±0.00	0.67 ±0.06	0.50 ±0.00	0.30 ±0.00	0.97	-0.011
2,3-Dimethylnaphthalene		0.40 ±0.00	0.37 ±0.06	0.33 ±0.06	0.40 ±0.00	0.43 ±0.06	0.33 ±0.06	0.30 ±0.00	0.20 ±0.00	0.10 ±0.00	0.81	-0.011

ND = non-detectable

TABLE E-8. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 5-19-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	1	2	4	8	16	24	36	[illegible]	r^2	Slope
		Concentration (mg/ℓ)										
Hexane		21.77 ±2.32	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		2.37 ±0.21	0.30 ±0.00	0.20 ±0.10	0.10 ±0.00	ND	ND	ND	ND	ND	0.75	-0.308
n-Heptane		0.10 ±0.00	0.10 ±0.00	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane		0.60 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		16.20 10.80	13.70 ±0.17	8.53 ±0.93	7.37 ±0.55	4.77 ±0.21	2.30 ±0.17	0.97 ±0.12	0.33 ±0.06	0.10 ±0.01	0.99	-0.045
Ethylcyclohexane		0.17 ±0.06	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		5.20 ±0.10	4.07 ±0.12	2.57 ±0.23	2.07 ±0.15	1.43 ±0.06	0.67 ±0.06	0.30 ±0.00	0.23 ±0.12	ND	-	-
Cumene		1.90 ±0.00	1.23 ±0.06	0.77 ±0.06	0.57 ±0.06	0.33 ±0.06	0.13 ±0.06	ND	ND	ND	0.19	-0.068
1,3,5-Trimethylbenzene		1.50 ±0.00	1.13 ±0.06	0.73 ±0.06	0.77 ±0.29	0.40 ±0.00	0.20 ±0.00	0.07 ±0.00	ND	ND	0.94	-0.051
Indan		3.30 ±0.00	3.23 ±0.06	2.30 ±0.20	2.13 ±0.12	1.80 ±0.10	1.17 ±0.06	0.73 ±0.06	0.50 ±0.06	0.33 ±0.06	0.97	-0.021
Naphthalene		4.10 ±0.17	3.70 ±0.10	3.03 ±0.21	3.20 ±0.17	3.17 ±0.15	2.43 ±0.21	2.03 ±0.06	1.67 ±0.06	1.53 ±0.06	0.92	-0.009
2-Methylnapthalene		1.13 ±0.06	1.00 ±0.00	0.83 ±0.06	0.87 ±0.06	0.83 ±0.06	0.70 ±0.00	0.50 ±0.00	0.40 ±0.00	0.30 ±0.00	0.96	-0.011
2,3-Dimethylnaphthalene		0.33 ±0.06	0.30 ±0.00	0.30 ±0.00	0.30 ±0.00	0.30 ±0.00	0.20 ±0.00	0.20 ±0.00	0.20 ±0.00	0.10 ±0.00	0.87	-0.009

ND = non-detectable

TABLE E-9. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 5-19-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	326.00 ±26.0	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	350.00 ±24.0	ND	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane	394.00 ±23.0	6.00 ±0.9	3.00 ±0.1	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	404.00 ±22.0	2[b] ±0.5	4.00 ±0.2	0.4 ±0.1	ND	ND	ND	ND	ND	0.96	-0.751
Toluene	420.00 ±21.0	29[b] ±9.0	52.00 ±2.0	13.00 ±2.5	3.6 ±1.4	ND	ND	ND	ND	0.92.	-0.248
n-Octane	443.00 ±20.0	45[b] ±14.0	73.00 ±2.0	17.00 ±3.0	3.9 ±1.2	3.7 ±0.7	0.6 ±0.00	ND	ND	0.81	-0.100
Ethylcyclohexane	444.00 ±19.0	57[b] ±17.0	105.00 ±3.0	29.00 ±5.0	7.8 ±2.7	3.6 ±0.7	0.6 ±0.00	ND	ND	0.90	-0.106
p-Xylene	446.00 ±18	95[b] ±28.0	229.00 ±5.0	93.00 ±16.0	57.00 ±19.0	13.00 ±3.0	2.00 ±0.1	ND	ND	0.98	-0.092
Cumene	454.00 ±17.0	132[b] ±38.0	331.00 ±5.0	165.00 ±27.0	139.00 ±44.0	55.00 ±12.0	12.00 ±0.4	3.00 ±0.5	ND	0.99	-0.060
1,3,5-Trimethylbenzene	528.00 ±47.0	38.00 ±8.0	390.00 ±24.0	321.00 ±41.0	281.00 ±34.0	164.00 ±37.0	65.00 ±2.0	19.00 ±3.0	7.00 ±0.3	0.99	-0.039
Indan	456.00 ±14.0	43.00[b] ±10.0	420.00 ±27.0	369.00 ±50.0	348.00 ±57.0	244.00 ±3.0	123.00 ±3.0	41.00 ±5.0	25.00 ±1.0	0.98	-0.028
Naphthalene	457.00 ±15.0	237.00[b] ±49.0	500.00 ±0.6	349.00 ±44.0	412.00 ±92.0	460.00 ±114.0	350.00 ±9.0	277.00 ±26.0	255.00 ±11.0	0.75	-0.005
Methylnaphthalene	522.00 ±59.0	71.00[b] ±25.0	471.00 ±33.0	522.00 ±96.0	521.00 ±137.0	515.00 ±129.0	467.00 ±60.0	371.00 ±82.0	335.00 ±16.0	0.76	-0.003
Tetradecane	451.00 ±19.0	265.00[b] ±57.0	550.00 ±10.0	359.00 ±38.0	441.00 ±65.0	537.00 ±132.0	442.00 ±10.0	455.00 ±30.0	444.00 ±19.0	0.00	-0.000
2,3-Dimethylnaphthalene	450.00 ±20.0	175.00[b] ±56.0	495.00 ±18.0	359.00 ±42.0	442.00 ±55.0	538.00 ±14.0	439.00 ±19.0	456.00 ±28.0	459.00 ±20.0	0.02	+0.000

ND = non-detectable
[b]Value unusually low. Not used in regression analysis.

TABLE E-10. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 5-19-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		538.00 ±113 0	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		553.00 ±99 0	ND	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		577.00 ±94.0	13.00 ±4.0	2.00 ±0.3	ND	ND	ND	ND	ND	ND	-	-
Methylcycl‹ hexane		584.00 ±90.0	3.00 ±0.4	4.00 ±0.3	1.10 ±0.2	ND	ND	ND	ND	ND	0.63	-0.566
Toluene		583.00 ±77.0	62.00 ±18.0	41.00 ±6.0	22.00 ±2.8	4.50 ±0.8	ND	ND	ND	ND	0.84	-0.222
n-Octane		593.00 ±70.0	93.00 ±25.0	58.00 ±8.0	30.00 ±4.0	4.40 ±0.8	ND	ND	ND	ND	0.91	-0.233
Ethylcyclol exane		587.00 ±62.0	113.00 ±28.0	85.00 12.0	50.00 ±6.0	9.80 ±1.6	1.00 ±0.3	1.40 ±0.4	0.70 ±0.00	ND	0.80	-0.075
p-Xylene		578.00 ±51.0	174.00 ±39.0	89.00 28.0	153.00 ±15.0	64.00 ±10.0	14.00 ±0.8	3.60 ±1.0	0.50 ±0.00	ND	0.98	-0.079
Cumene		575.00 ±4.0	230.00 ±46.0	82.00 42.0	257.00 ±23.0	151.00 ±22.0	60.00 ±5.0	22.00 ±6.0	2.00 ±0.00	ND	0.97	-0.061
1,3,5-Trim thylbenzene		500.00 ±66.0	332.0 ± ±58.5	22.00 19.0	302.00 ±38.0	340.00 ±73.0	170.00 ±16.0	100.00 ±25.0	15.00 ±2.0	3.00 ±0.3	0.95	-0.043
Indan		561.00 ±24.0	357.00 ±53.9	59.00 21.0	335.00 ±46.0	416.00 ±95.0	247.00 ±27.0	174.00 ±37.0	39.00 ±2.0	10.00 ±1.0	0.93	-0.033
Naphthalen		548.00 ±12.0	39.00 ±31.0	53.00 63.0	453.00 ±16.0	436.00 ±43.0	448.00 ±70.0	411.00 ±55.0	275.00 ±13.0	214.00 ±14.0	0.81	-0.007
Methylnaph halene		469.00 ±77.0	467.4 ±19.9	47.00 44.0	389.00 ±73.0	595.00 ±161.0	497.00 ±96.0	490.00 ±209.0	475.00 ±37.0	465.00 ±16.0	0.19	-0.002
n-Tetradec ne		528.00 ±19.0	444.00 ±20.0	511.00 10.0	446.00 ±38.0	467.00 ±65.0	519.00 ±132.0	486.00 ±10.0	437.00 ±30.0	435.00 ±19.0	0.23	-0.001
2,3-Dimethy lnaphthalene		529.00 ±9.0	465.00 ±13.0	38.00 55.0	415.00 ±26.0	447.00 ±35.0	520.00 ±122.0	419.00 ±164.0	539.00 ±37.0	460.00 ±10.0	0.03	+0.000

ND - non-d‹ tectable

TABLE E-11. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 5-19-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		a	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		a	10.00 ±3.0	0.4 ±0.0	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		a	40.00 ±11.0	2.00 ±0.2	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane		a	42.00 ±3.0	4.00 ±0.4	0.7 ±0.1	ND	ND	ND	ND	ND	0.93	-0.562
Toluene		a	160.00 ±36.0	38.00 ±4.0	18.00 ±2.5	8.00 ±1.6	ND	ND	ND	ND	0.83	-0.163
n-Octane		a	222.00 ±46.0	54.00 ±68.0	25.00 ±3.0	8.4 ±1.6	0.9 ±0.1	ND	ND	ND	0.94	-0.143
Ethylcyclohexane		a	257.00 ±48.0	79.00 ±9.0	41.00 ±5.0	17.6 ±3.6	1.15 ±0.2	ND	ND	ND	0.97	-0.139
p-Xylene		a	361.00 ±56.0	177.00 ±18.0	125.00 ±16.0	96.00 ±20.0	17.00 ±1.8	5.00 ±0.5	ND	ND	0.98	-0.076
Cumene		a	433.00 ±56.0	262.00 ±26.0	210.00 ±25.0	207.00 ±44.0	69.00 ±9.0	32.00 ±3.0	8.00 ±0.00	1.3 ±0.4	0.99	-0.050
1,3,5-Trimethylbenzene		a	406.00 ±79.0	463.00 ±38.0	297.00 ±44.0	341.00 ±75.0	178.00 ±28.0	123.00 ±10.0	17.00 ±0.3	9.00 ±0.8	0.95	-0.039
Indan		a	415.00 ±88.0	511.00 ±43.0	332.00 ±52.0	406.00 ±91.0	247.00 ±48.0	196.00 ±13.0	49.00 ±2.0	21.00 ±2.0	0.92	-0.029
Naphthalene		a	502.00 ±19.0	437.00 ±32.0	383.00 ±34.0	540.00 ±127.0	403.00 ±102.0	404.00 ±15.0	277.00 ±9.0	238.00 ±12.0	0.78	-0.006
Methylnaphthalene		a	426.00 ±110.0	602.00 ±100.0	400.00 ±74.0	502.00 ±114.0	429.00 ±127.0	412.00 ±113.0	465.00 ±83.0	375.00 ±12.0	0.21	-0.002
n-Tetradecane		a	501.00 ±14.0	445.00 ±21.0	409.00 ±20.0	613.00 ±162.0	435.00 ±145.0	469.00 ±7.0	415.00 ±11.0	437.00 ±8.0	0.11	-0.001
2,3-Dimethylnaphthalene		a	497.00 ±12.0	457.00 ±25.0	392.00 ±28.0	623.00 ±168.0	434.00 ±147.0	466.00 ±37.0.	514.00 ±91.0	459.00 ±6.0	0.00	+0.000

ND = non-detectable
a - sample lost during extraction

TABLE E-12. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 5-19-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	45	r^2	Slope
Hexane		459.00 ±26.0	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		479.00 ±30.0	6.00 ±1.0	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		494.00 ±31.0	30.00 ±7.0	0.80 ±0.1	0.05 ±0.0	ND	ND	ND	ND	ND	0.95	-1.003
Methylcyclohexane		504.00 ±33.0	35.00 ±6.0	15.00 ±0.2	1.20 ±0.2	ND	ND	ND	ND	ND	0.95	-0.619
Toluene		501.00 ±33.0	132.00 ±34.0	27.00 ±3.0	24.00 ±2.8	6.80 ±0.8	0.70 ±0.1	ND	ND	ND	0.89	-0.156
n-Octane		510.00 ±34.0	193.00 ±51.0	36.00 ±4.0	26.00 ±16.0	8.40 ±1.2	5.30 ±0.6	ND	ND	ND	0.72	-0.109
Ethylcyclohexane		507.00 ±33.0	224.00 ±60.0	58.00 ±5.0	60.00 ±6.0	16.90 ±2.5	6.00 ±0.8	ND	ND	ND	0.85	-0.108
p-Xylene		502.00 ±32.0	317.00 ±87.0	160.00 ±12.0	168.00 ±16.0	92.00 ±15.0	31.00 ±4.3	1.40 ±0.1	ND	ND	0.94	-0.093
Cumene		502.00 ±31.0	383.00 ±105.0	256.00 ±17.0	275.00 ±25.0	202.00 ±34.0	103.00 ±16.0	11.00 ±0.7	1.90 ±0.2	ND	0.96	-0.065
1,3,5-Trimethylbenzene		534.00 ±28.0	414.00 ±24.0	390.00 ±63.0	367.00 ±72.0	337.00 ±6.0	229.00 ±40.0	73.00 ±5.0	27.00 ±1.9	4.00 ±0.2	0.95	-0.042
Indan		498.00 ±4.0	424.00 ±24.0	435.00 ±74.0	406.00 ±82.0	402.00 ±72.0	300.00 ±57.0	140.00 ±8.0	70.00 ±4.0	15.00 ±0.6	0.92	-0.030
Naphthalene		494.00 ±25.0	455.00 ±116.0	460.00 ±21.0	478.00 ±33.0	531.00 ±100.0	454.00 ±103.0	380.00 ±18.0	330.00 ±5.0	235.00 ±7.0	0.85	-0.006
Methylnaphthalene		478.00 ±36.0	453.00 ±14.0	560.00 ±110.0	474.00 ±108.0	553.00 ±109.0	480.00 ±120.0	356.00 ±147.0	560.00 ±80.0	387.00 ±8.0	0.30	+0.002
n-Tetradecane		475.00 ±19.0	506.00 ±91.0	455.00 ±21.0	439.00 ±48.0	564.00 ±117.0	482.00 ±125.0	462.00 ±22.0	466.00 ±26.0	457.00 ±9.0	0.06	-0.570
2,3-Dimethylnaphthalene		418.00 ±24.0	396.00 ±38.0	465.00 ±16.0	474.00 ±27.0	549.00 ±115.0	484.00 ±136.0	478.00 ±23.0	568.00 ±49.0	486.00 ±6.0	0.30	+0.002

ND = non-detectable

TABLE E-13. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 6-8-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		1.13 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		2.37 ±0.02	0.56 ±0.01	0.24 ±0.07	ND	ND	ND	ND	ND	ND	0.96	-.056
n-Heptane		0.20 ±0.01	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane		0.74 ±0.02	0.17 ±0.01	ND	ND	ND	ND	ND	ND	ND	1.00	-0.648
Toluene		15.53 ±0.50	9.23 ±0.25	8.77 ±2.47	6.50 ±0.26	2.20 ±0.36	1.70 ±0.36	0.60 ±0.20	0.17 ±0.06	ND	0.95	-0.052
Ethylcyclohexane		0.21 ±0.01	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		4.57 ±0.15	2.60 ±0.00	2.40 ±0.60	1.67 ±0.06	0.53 ±0.06	0.43 ±0.06	0.20 ±0.00	ND	ND	0.89	-0.057
Cumene		1.77 ±0.06	0.90 ±0.00	0.80 ±0.20	0.50 ±0.00	0.20 ±0.00	0.13 ±0.06	ND	ND	ND	0.86	-0.067
1,3,5-Trimethylbenzene		1.47 ±0.06	0.87 ±0.06	0.80 ±0.20	0.57 ±0.06	0.24 ±0.06	0.24 ±0.03	ND	ND	ND	0.75	-0.052
Indan		2.79 ±0.07	2.10 ±0.02	1.80 ±0.17	0.73 ±0.05	0.68 ±0.04	0.86 ±0.06	0.57 ±0.09	0.31 ±0.03	0.27 ±0.01	0.87	-0.020
Naphthalene		3.04 ±0.06	2.61 ±0.07	2.25 ±0.33	2.59 ±0.08	1.44 ±0.21	2.00 ±0.19	1.67 ±0.19	0.83 ±0.06	0.18 ±0.02	0.81	-0.020
2-Methylnaphthalene		0.99 ±0.02	0.88 ±0.03	0.91 ±0.14	0.94 ±0.03	0.48 ±0.03	0.73 ±0.06	0.62 ±0.05	0.40 ±0.00	0.47 ±0.06	0.63	-0.007
2,3-Dimethylnaphthalene		0.35 ±0.01	0.39 ±0.02	0.39 ±0.06	0.44 ±0.02	0.27 ±0.03	0.39 ±0.03	0.35 ±0.02	0.26 ±0.02	0.43 ±0.01	0.01	-0.001

ND = non-detectable

TABLE E-14. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 6-8-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		2.42 ±0.45	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		1.53 ±0.23	0.53 ±0.05	0.20 ±0.03	ND	ND	ND	ND	ND	ND	0.98	-.437
n-Heptane		0.11 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	1.00	-2.038
Methylcyclohexane		0.44 ±0.08	0.15 ±0.02	ND	ND	ND	ND	ND	ND	ND	0.94	-0.473
Toluene		10.80 ±1.57	7.80 ±0.87	7.47 ±0.80	3.80 ±0.20	2.67 ±0.25	1.20 ±0.10	0.63 ±0.06	ND	ND	0.95	-0.049
Ethylcyclohexane		0.11 ±0.01	ND	ND	ND	ND	ND	ND	ND	ND	-	-
_p_-Xylene		3.13 ±0.40	1.93 ±0.21	1.93 ±0.15	1.03 ±0.06	0.70 ±0.10	0.33 ±0.06	0.20 ±0.00	ND	ND	-	-
Cumene		1.17 ±0.15	0.67 ±0.06	0.63 ±0.06	0.30 ±0.00	0.23 ±0.06	0.10 ±0.00	ND	ND	ND	0.89	-0.061
1,3,5-Trimethylbenzene		0.97 ±0.15	0.80 ±0.10	0.63 ±0.06	0.50 ±0.00	0.30 ±0.00	0.20 ±0.00	ND	ND	ND	0.93	-0.042
Indan		1.96 ±0.25	1.97 ±0.34	1.68 ±0.12	1.07 ±0.05	0.93 ±0.10	0.67 ±0.03	0.59 ±0.04	0.18 ±0.01	0.10 ±0.00	0.96	-0.026
Naphthalene		2.14 ±0.27	1.95 ±0.11	2.16 ±0.16	1.64 ±0.05	1.49 ±0.13	1.43 ±0.03	1.46 ±0.08	0.10 ±0.00	0.10 ±0.00	0.83	-.029
2-Methylnaphthalene		0.67 ±0.08	0.62 ±0.03	0.74 ±0.01	0.61 ±0.01	0.53 ±0.06	0.53 ±0.02	0.60 ±0.00	0.13 ±0.06	0.17 ±0.06	0.73	-0.015
2,3-Dimethylnaphthalene		0.23 ±0.02	0.23 ±0.02	0.26 ±0.01	0.28 ±0.01	0.27 ±0.01	0.28 ±0.02	0.32 ±0.01	0.22 ±0.01	0.33 ±0.01	0.16	-0.002

ND = non-detectable

TABLE E-15. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 6-8-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	3.43 ±0.67	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	1.76 ±0.37	0.52 ±0.12	0.19 ±0.00	ND	ND	ND	ND	ND	ND	0.97	-.098
n-Heptane	0.15 ±0.04	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Methylcyclohexane	0.56 ±0.11	0.15 ±0.03	ND	ND	ND	ND	ND	ND	ND	0.94	-0.563
Toluene	11.93 ±2.47	7.93 ±1.63	7.10 ±0.30	6.83 ±0.31	3.77 ±0.55	1.27 ±0.25	0.53 ±0.15	0.20 ±0.00	0.12	0.96	-0.043
Ethylcyclohexane	0.18 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene	3.60 ±0.72	2.17 ±0.47	2.00 ±0.10	1.57 ±0.49	1.00 ±0.10	0.43 ±0.06	0.17 ±0.06	ND	ND	0.95	-0.051
Cumene	1.47 ±0.25	0.73 ±0.15	0.67 ±0.06	0.60 ±0.00	0.30 ±0.00	0.13 ±0.06	ND	ND	ND	0.90	-0.059
1,3,5-Trimethylbenzene	1.33 ±0.31	0.73 ±0.06	0.67 ±0.06	0.67 ±0.06	0.33 ±0.06	0.23 ±0.01	ND	ND	ND	0.82	-0.044
Indan	2.34 ±0.09	1.87 ±0.15	1.92 ±0.19	1.96 ±0.08	1.25 ±0.15	0.96 ±0.07	0.55 ±0.12	0.44 ±0.02	0.33 ±0.01	0.76	-0.004
Naphthalene	2.61 ±0.21	2.15 ±0.22	2.36 ±0.21	2.77 ±0.19	1.85 ±0.16	1.82 ±0.07	1.14 ±0.17	1.10 ±0.08	1.14 ±0.03	0.88	-.004
2-Methylnaphthalene	1.07 ±0.34	0.71 ±0.09	0.79 ±0.06	0.97 ±0.06	0.67 ±0.06	0.60 ±0.00	0.40 ±0.00	0.40 ±0.00	0.40 ±0.00	0.84	-0.005
2,3-Dimethylnaphthalene	0.38 ±0.03	0.32 ±0.04	0.34 ±0.01	0.47 ±0.01	0.34 ±0.02	0.35 ±0.01	0.27 ±0.03	0.25 ±0.01	0.38 ±0.02	0.09	-0.002

ND = non-detectable

TABLE E-16. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 6-8-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		5.57 ±1.31	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		1.95 ±0.48	0.53 ±0.11	0.18 ±0.03	ND	ND	ND	ND	ND	ND	0.96	-0.514
n-Heptane		0.13 ±0.03	ND	ND	ND	ND	ND	ND	ND	ND	1.00	-2.038
Methylcyclohexane		0.566 ±0.14	0.17 ±0.03	ND	ND	ND	ND	ND	ND	ND	0.90	-0.506
Toluene		13.93 ±3.63	7.60 ±1.37	5.87 ±0.81	5.03 ±0.38	3.40 ±0.36	1.57 ±0.15	0.47 ±0.12	0.15 ±0.02	ND	0.97	-0.051
Ethylcyclohexane		0.14 ±0.03	ND	ND	ND	ND	ND	ND	ND	ND	-	-
p-Xylene		4.13 ±1.08	2.03 ±0.31	1.53 ±0.21	1.33 ±0.12	0.87 ±0.06	0.43 ±0.06	0.13 ±0.06	ND	ND	0.93	-0.053
Cumene		1.57 ±0.40	0.70 ±0.10	0.50 ±0.10	0.40 ±0.00	0.27 ±0.06	0.17 ±0.06	ND	ND	ND	0.74	-0.057
1,3,5-Trimethylbenzene		1.33 ±0.11	0.69 ±0.08	0.49 ±0.07	0.60 ±0.06	0.37 ±0.02	0.24 ±0.03	ND	ND	ND	0.72	-0.039
Indan		2.74 ±0.24	1.60 ±0.21	1.60 ±0.10	1.42 ±0.09	1.11 ±0.07	0.84 ±0.11	0.48 ±0.06	0.34 ±0.01	0.23 ±0.01	0.59	-0.005
Naphthalene		2.76 ±0.52	2.00 ±0.22	1.81 ±0.21	2.18 ±0.09	1.77 ±0.13	1.76 ±0.19	1.24 ±0.12	1.02 ±0.04	0.86 ±0.06	0.91	-.005
2-Methylnaphthalene		0.93 ±0.05	0.61 ±0.06	0.57 ±0.06	0.71 ±0.02	0.60 ±0.00	0.57 ±0.06	0.47 ±0.05	0.40 ±0.00	0.37 ±0.06	0.73	-0.006
n-Tetradecane		0.09 ±0.04	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,3-Dimethylnaphthalene		0.30 ±0.03	0.22 ±0.03	0.22 ±0.03	0.32 ±0.02	0.32 ±0.03	0.30 ±0.04	0.27 ±0.02	0.25 ±0.01	0.40 ±0.04	0.14	-0.002

ND = non-detectable

TABLE E-17. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 6-8-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
		Concentration (mg/ℓ)										
Hexane		248.33 ±65.57	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		289.67 ±68.65	5.73 ±2.72	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		330.33 ±84.11	19.87 ±9.22	2.30 ±2.34	ND	ND	ND	ND	ND	ND	0.79	-0.682
Methylcyclohexane		336.00 ±78.82	27.40 ±12.34	3.30 ±2.69	ND	ND	ND	ND	ND	ND	0.95	-1.045
Toluene		344.33 ±76.00	106.57 ±44.73	28.70 ±11.47	10.60 ±0.44	2.47 ±0.72	ND	ND	ND	ND	0.90	-0.253
n-Octane		360.00 ±76.30	153.33 ±61.17	43.57 ±15.88	15.03 ±0.23	3.17 ±0.64	ND	ND	ND	ND	0.93	-0.249
Ethylcyclohexane		359.33 ±74.20	186.90 ±68.59	66.60 ±21.74	25.87 ±0.15	6.63 ±0.35	ND	ND	ND	ND	0.94	-0.211
p-Xylene		358.67 ±71.00	288.00 ±91.76	160.67 ±44.84	82.03 ±2.45	43.30 ±3.20	5.30 ±0.89	4.20 ±1.22	ND	ND	0.95	-0.061
Cumene		535.67 ±53.80	406.67 ±87.16	335.33 ±62.55	214.67 ±8.39	203.00 ±18.62	100.23 ±10.60	95.97 ±13.15	23.40 ±2.57	ND	0.96	-0.034
1,3,5-Trimethylbenzene		562.00 ±63.98	415.33 ±68.49	275.00 ±13.89	251.33 ±10.69	257.33 ±24.01	164.57 ±17.27	158.87 ±21.67	60.83 ±6.78	27.57 ±3.69	0.95	-0.022
Indan		362.00 ±63.98	415.33 ±68.49	275.00 ±13.89	251.33 ±10.69	257.33 ±24.01	164.57 ±17.27	158.87 ±21.67	60.83 ±6.78	27.57 ±3.69	0.95	-0.022
Naphthalene		361.00 ±59.15	430.00 ±30.45	439.00 ±20.74	325.00 ±14.80	380.67 ±35.27	367.50 ±35.46	357.03 ±44.17	305.33 ±25.40	301.67 ±5.53	0.40	-0.003
2-Methylnaphthalene		358.67 ±56.15	431.00 ±23.43	336.67 ±60.00	344.00 ±16.52	493.33 ±45.71	428.00 ±39.77	491.07 ±14.76	392.40 ±26.53	400.77 ±152.48	0.01	-0.001
n-Tetradecane		359.33 ±52.25	439.00 ±26.96	460.33 ±11.72	351.00 ±17.44	428.67 ±38.80	452.13 ±41.74	424.33 ±47.70	420.97 ±27.24	485.93 ±18.31	0.17	-0.001
2,3-Dimethylnaphthalene		357.00 ±52.85	433.00 ±26.91	452.33 ±17.62	350.00 ±17.35	503.33 ±43.04	451.00 ±41.19	511.57 ±20.12	419.77 ±24.93	492.13 ±21.71	0.17	-0.002

ND - non-detectable

TABLE E-18. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 6-8-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		281.67 ±41.40	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		316.67 ±44.74	2.57 ±0.21	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		344.67 ±40.50	12.97 ±1.03	1.23 ±0.25	ND	ND	ND	ND	ND	ND	0.99	-1.225
Methylcyclohexane		354.67 ±37.29	19.00 ±1.39	2.30 ±0.40	ND	ND	ND	ND	ND	ND	0.99	-1.096
Toluene		357.33 ±31.50	82.37 ±6.03	30.43 ±5.36	11.97 ±0.59	1.37 ±0.06	ND	ND	ND	ND	0.95	-0.280
n-Octane		369.57 ±31.50	120.53 18.83	42.20 ±7.08	17.70 ±0.79	1.80 ±0.10	ND	ND	ND	ND	0.97	-0.274
Ethylcyclohexane		369.67 ±28.01	154.73 ±11.13	65.33 ±10.38	31.27 ±1.31	4.50 ±0.17	ND	ND	ND	ND	0.98	-0.228
p-Xylene		369.00 ±23.07	255.77 ±16.71	163.33 ±23.35	105.90 ±3.58	37.90 ±1.37	10.03 ±0.87	2.37 ±0.06	ND	ND	0.99	-0.888
Cumene		375.33 ±17.62	339.50 ±19.58	254.00 ±32.45	193.00 ±5.29	105.77 ±3.20	47.60 ±3.41	17.77 ±0.61	1.50 ±0.02	ND	0.98	-0.063
1,3,5-Trimethylbenzene		559.67 ±111.96	402.77 ±18.83	336.67 ±37.61	286.67 ±5.86	209.03 ±5.03	140.50 ±7.98	84.57 ±3.31	23.33 ±3.05	12.47 ±1.50	0.98	-0.033
Indan		381.33 ±9.71	426.80 ±15.00	250.00 ±5.29	334.00 ±5.29	271.30 ±5.20	209.37 18.83	147.73 ±6.26	61.90 ±6.95	38.70 ±4.56	0.96	-0.021
Naphthalene		389.67 ±4.04	466.37 ±5.69	421.67 ±31.90	427.67 ±3.06	415.63 ±3.04	397.27 ±5.02	366.63 120.98	332.60 ±20.98	298.03 ±36.30	0.71	-0.003
2-Methylnaphthalene		392.67 ±1.53	470.90 ±12.08	377.67 ±15.95	449.33 ±3.51	525.97 ±16.08	450.00 ±0.70	530.93 ±74.27	442.30 ±15.68	421.83 ±52.61	0.01	+0.000
n-Tetradecane		396.00 ±1.0	468.50 ±16.47	425.33 ±24.42	457.67 ±3.51	471.07 ±1.42	475.10 ±0.61	445.87 ±35.93	482.87 ±9.45	462.40 ±57.00	0.12	+0.001
2,3-Dimethylnaphthalene		396.00 ±0.00	467.00 ±19.97	417.00 ±24.58	454.33 ±3.79	705.17 ±12.56	472.33 ±1.42	555.87 ±72.66	483.00 ±6.00	462.73 ±57.61	0.1	+0.001

ND = non-detectable

TABLE E-19. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 6-8-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane	412.00 ±124.45	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	451.50 ±139.30	4.37 ±0.68	2.40 ±0.36	ND	ND	ND	ND	ND	ND	0.79	-1.066
n-Heptane	480.00 ±134.35	22.13 ±3.12	2.70 ±0.44	ND	ND	ND	ND	ND	ND	0.98	-1.107
Methylcyclohexane	491.00 ±125.87	30.07 ±4.05	2.87 ±0.42	ND	ND	ND	ND	ND	ND	0.99	-1.108
Toluene	472.00 ±121.62	101.43 ±11.69	41.03 ±6.15	11.17 ±1.56	2.27 ±0.15	ND	ND	ND	ND	0.93	-0.261
n-Octane	479.00 ±115.97	154.03 ±16.42	127.70 ±19.26	17.00 ±2.26	3.07 ±0.25	ND	ND	ND	ND	0.96	-0.267
Ethylcyclohexane	467.00 ±106.42	183.17 ±17.44	152.73 ±22.28	30.47 ±3.68	7.03 ±0.38	ND	ND	ND	ND	0.96	-0.222
p-Xylene	450.00 ±91.92	267.00 ±20.88	248.33 ±34.20	107.60 ±11.23	48.90 ±2.01	9.70 ±1.65	2.20 ±0.10	ND	ND	0.99	-0.093
Cumene	437.50 ±77.07	333.67 ±21.39	335.33 ±41.88	199.67 ±17.47	124.47 ±3.99	48.27 ±6.99	19.10 ±0.72	1.77 ±0.15	ND	0.99	-0.063
1,3,5-Trimethylbenzene	370.00 ±124.45	382.00 ±19.05	408.67 ±45.62	299.33 ±21.22	228.33 ±5.59	147.10 ±17.77	92.10 ±3.06	26.30 ±2.19	11.50 ±0.26	0.98	-0.032
Indan	515.33 ±190.52	401.33 ±15.89	374.00 ±122.76	349.00 ±19.47	286.33 ±5.30	218.13 ±21.10	158.90 ±4.88	66.87 ±5.33	34.40 ±3.13	0.96	-0.023
Naphthalene	425.67 ±93.72	443.67 ±7.51	479.67 ±26.27	444.00 ±11.79	415.00 ±4.75	407.03 ±16.88	379.00 ±8.32	317.37 ±21.07	289.70 ±33.05	0.77	-0.004
2-Methylnaphthalene	376.00 ±45.04	456.00 ±4.58	415.00 ±169.72	462.00 ±6.00	436.17 ±30.23	450.03 ±6.57	470.33 ±17.35	416.53 ±25.32	409.47 ±40.94	0.00	+0.000
n-Tetradecane	345.67 ±16.80	464.00 ±3.61	474.67 ±6.66	468.33 ±3.79	458.03 ±3.27	467.03 ±2.28	454.17 ±4.79	453.40 ±26.33	448.03 ±42.75	0.03	+0.005
2,3-Dimethylnaphthalene	338.33 ±14.01	463.67 ±3.06	469.00 ±5.20	463.33 ±2.08	449.90 ±26.13	459.40 ±3.13	490.60 ±79.33	461.40 ±26.93	464.93 ±43.07	0.09	+0.001

ND = non-detectable

TABLE E-20. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 6-8-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	1	2	4	8	16	24	36	48	r^2	Slope
Hexane		396.67 ±141.92	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		440.67 ±147.19	1.60 ±0.02	ND	ND	ND	ND	ND	ND	ND	-	-
n-Heptane		480.00 ±146.43	8.57 ±0.96	0.77 ±0.06	ND	ND	ND	ND	ND	ND	0.98	-1.392
Methylcyclohexane		488.33 ±142.98	12.97 ±1.36	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		484.33 ±129.87	61.63 ±6.74	29.90 ±6.81	10.50 ±1.50	3.00 ±1.59	ND	ND	ND	ND	0.85	-0.246
n-Octane		479.33 ±123.71	93.43 ±10.19	45.90 ±9.99	14.50 ±2.00	5.20 ±3.49	ND	ND	ND	ND	0.86	-0.231
Ethylcyclohexane		491.00 ±113.50	122.90 ±13.36	70.73 ±14.67	29.97 ±3.30	9.80 ±3.80	ND	ND	ND	ND	0.96	-0.222
p-Xylene		481.33 ±100.07	212.80 ±22.38	174.57 ±33.34	94.33 ±11.46	52.33 ±7.07	12.47 ±2.97	2.97 ±0.15	ND	ND	0.97	-0.085
Cumene		478.67 ±85.91	291.80 ±28.87	276.13 ±47.98	174.00 ±20.52	139.37 ±12.68	59.90 ±1.41	21.67 ±0.23	2.23	ND	0.98	-0.059
1,3,5-Trimethylbenzene		456.33 ±153.75	357.87 ±32.61	370.23 ±56.18	262.67 ±31.01	250.90 ±29.27	173.50 ±32.91	98.77 ±4.26	29.50 ±2.04	12.70 ±0.17	0.97	-0.031
Indan		467.00 ±59.23	388.40 ±31.67	411.30 ±52.73	311.67 ±37.00	326.40 ±16.18	251.17 ±41.69	167.40 ±6.13	71.73 ±4.19	39.37 ±0.46	0.97	-0.021
Naphthalene		456.33 ±30.57	454.30 ±23.27	485.60 ±31.93	411.00 ±48.51	479.41 ±57.90	444.77 ±47.89	389.17 ±7.68	316.77 ±10.06	303.13 ±3.75	0.750	-0.004
2-Methylnaphthalene		449.00 ±15.52	473.53 ±14.60	489.83 ±18.66	385.33 ±137.01	445.17 ±140.19	481.73 ±38.10	362.10 ±47.91	410.73 ±7.03	421.83 ±52.61	0.04	-0.001
n-Tetradecane		446.00 ±6.56	478.20 ±8.89	481.27 ±17.35	452.00 ±49.12	473.23 ±19.38	497.13 ±31.79	461.77 ±6.31	447.33 ±4.29	470.37 ±3.18	0.00	-0.001
2,3-Dimethylnaphthalene		444.67 ±3.51	483.50 ±5.35	479.90 ±20.02	448.33 ±48.54	448.87 ±147.01	485.60 ±29.68	370.57 ±55.60	452.53 ±2.51	470.60 ±3.49	0.00	-0.000

ND = non-detectable

TABLE E-21. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 8-10-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours) Concentration (mg/ℓ): 0	2	4	8	24	48	72	120	168	r^2	Slope
Hexane	4.19 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	0.56 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	4.46 ±0.09	3.43 ±0.05	2.58 ±0.15	1.70 ±0.13	0.40 ±0.00	ND	ND	ND	ND	0.99	-0.043
p-Xylene	1.31 ±0.02	0.92 ±0.02	0.68 ±0.04	0.44 ±0.02	ND	ND	ND	ND	ND	0.98	-0.059
Cumene	0.44 ±0.10	0.28 ±0.00	0.19 ±0.01	ND	ND	ND	ND	ND	ND	0.99	-0.104
1,3,5-Trimethylbenzene	0.47 ±0.01	0.39 ±0.01	0.28 ±0.01	0.23 ±0.01	ND	ND	ND	ND	ND	0.94	-0.020
Indan	0.89 ±0.02	0.84 ±0.01	0.69 ±0.03	0.59 ±0.01	0.30 ±0.01	ND	ND	ND	ND	0.99	-0.020
Naphthalene	1.02 ±0.02	1.14 ±0.01	1.06 ±0.05	1.13 ±0.01	0.86 ±0.03	0.22 ±0.01	ND	ND	ND	0.87	-0.014
2-Methylnaphthalene	0.32 ±0.01	0.34 ±0.01	0.32 ±0.02	0.33 ±0.01	0.25 ±0.01	ND	ND	ND	ND	0.84	-0.006
2,3-Dimethylnaphthalene	0.14 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	-	-

TABLE E-22. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 8-10-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours) Concentration (mg/ℓ): 0	2	4	8	24	48	72	120	168	r^2	Slope
Hexane	5.23 ±0.61	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane	0.46 ±0.01	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	3.70 ±0.20	3.10 ±0.22	2.79 ±0.17	1.42 ±0.16	ND	ND	ND	ND	ND	0.92	-0.052
p-Xylene	1.12 ±0.04	0.91 ±0.03	0.79 ±0.06	0.43 ±0.04	ND	ND	ND	ND	ND	0.96	-0.052
Cumene	0.41 ±0.01	0.27 ±0.00	0.22 ±0.02	ND	ND	ND	ND	ND	ND	0.94	-0.066
1,3,5-Trimethylbenzene	0.42 ±0.02	0.39 ±0.02	0.31 ±0.02	0.24 ±0.03	ND	ND	ND	ND	ND	0.92	-0.033
Indan	0.78 ±0.03	0.79 ±0.03	0.81 ±0.05	0.57 ±0.04	0.27 ±0.02	ND	ND	ND	ND	0.96	-0.066
Naphthalene	0.93 ±0.03	1.02 ±0.05	1.12 ±0.11	1.05 ±0.08	0.51 ±0.01	ND	ND	ND	ND	0.77	-0.013
2-Methylnaphthalene	0.27 ±0.01	0.30 ±0.01	0.27 ±0.02	0.30 ±0.02	0.17 ±0.00	ND	ND	ND	ND	0.80	-0.010
2,3-Dimethylnaphthalene	0.17 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	-	-

TABLE E-23. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 8-10-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
		Concentration (mg/ℓ)										
Hexane		6.02 ±0.16	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		0.69 ±0.02	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		5.80 ±0.07	3.09 ±0.08	2.66 ±0.19	1.69 ±0.11	0.11 ±0.01	ND	ND	ND	ND	0.99	-0.070
p-Xylene		1.73 ±0.01	0.83 ±0.03	0.69 ±0.03	0.45 ±0.03	ND	ND	ND	ND	ND	0.38	-0.067
Cumene		0.66 ±0.00	0.26 ±0.01	0.26 ±0.02	ND	ND	ND	ND	ND	ND	0.77	-0.101
1,3,5-Trimethylbenzene		0.65 ±0.00	0.34 ±0.01	0.35 ±0.03	0.21 ±0.01	ND	ND	ND	ND	ND	0.86	-0.054
Indan		1.21 ±0.01	0.74 ±0.03	0.69 ±0.04	0.60 ±0.03	0.32 ±0.01	ND	ND	ND	ND	0.88	-0.020
Naphthalene		1.40 ±0.03	1.02 ±0.03	1.08 ±0.07	1.14 ±0.03	0.89 ±0.02	0.86 ±0.03	0.36 ±0.02	0.23 ±0.01	0.13 ±0.01	-	-
2-Methylnaphthalene		0.42 ±0.01	0.30 ±0.01	0.32 ±0.03	0.34 ±0.01	0.25 ±0.01	0.22 ±0.01	ND	ND	ND	0.73	-0.005
2,3-Dimethylnaphthalene		0.19 ±0.01	0.15 ±0.00	ND	ND	ND	ND	ND	ND	ND	(-)	(-)

TABLE E-24. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 8-10-82 BAYOU CHICO SHAKEN FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
		Concentration										
Hexane		5.38 ±0.08	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		0.62 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		5.21 ±0.17	2.53 ±0.03	1.67 ±0.17	1.38 ±0.08	ND	ND	ND	ND	ND	0.81	-0.068
p-Xylene		1.58 ±0.04	0.72 ±0.01	0.51 ±0.05	0.43 ±0.01	ND	ND	ND	ND	ND	0.79	-0.066
Cumene		0.48 ±0.17	0.22 ±0.00	0.21 ±0.01	ND	ND	ND	ND	ND	ND	0.61	-0.083
1,3,5-Trimethylbenzene		0.56 ±0.02	0.30 ±0.01	0.30 ±0.01	0.22 ±0.01	ND	ND	ND	ND	ND	0.80	-0.046
Indan		1.09 ±0.03	0.64 ±0.01	0.52 ±0.03	0.53 ±0.02	0.27 ±0.02	ND	ND	ND	ND	0.82	-0.021
Naphthalene		1.29 ±0.03	0.87 ±0.02	0.84 ±0.04	0.94 ±0.03	0.71 ±0.02	0.46 ±0.01	0.41 ±0.02	0.29 ±0.01	0.15 ±0.01	0.95	-0.005
2-Methylnaphthalene		0.38 ±0.01	0.32 ±0.01	0.35 ±0.01	0.27 ±0.01	0.21 ±0.01	0.21 ±0.01	ND	ND	ND	0.71	-0.005
2,3-Dimethylnaphthalene		0.26 ±0.00	0.25 ±0.00	ND	ND	ND	ND	ND	ND	ND	-	-

TABLE E-25. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 8-10-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	175	r^2	Slope
Benzene		252.00 ±24.56	ND	ND	ND	ND	ND	ND	ND	ND	0.48	-0.044
Cyclohexane		260.33 ±36.61	42.12 ±3.09	12.67 ±0.64	12.77 ±0.59	7.63 ±0.42	ND	ND	ND	ND	0.48	-0.044
n-Heptane		277.67 ±28.29	76.60 ±5.02	34.47 ±1.68	29.27 ±0.64	30.73 ±1.91	30.50 ±1.05	29.30 ±5.31	12.73 ±0.93	7.23 ±0.40	0.62	-0.006
Methylcyclohexane		281.67 ±23.71	73.00 ±4.51	28.97 ±1.68	23.43 ±0.25	25.50 ±1.57	13.27 ±0.67	11.43 ±±.50	2.20 ±0.00	2.03 ±0.15	0.77	-0.010
Toluene		303.33 ±23.80	58.53 ±3.18	14.57 ±0.81	2.93 ±0.06	ND	ND	ND	ND	ND	0.97	-0.247
n-Octane		290.67 ±21.55	108.33 ±5.69	49.87 ±2.72	39.80 ±1.04	47.57 ±2.44	38.83 ±2.61	36.90 ±4.11	33.70 ±1.73	16.60 11.06	0.51	-0.004
Ethylcyclohexane		291.67 ±19.55	114.67 ±5.13	51.90 ±2.77	37.93 ±0.99	42.63 ±2.04	30.17 ±2.24	31.33 ±3.37	18.57 ±0.92	10.40 ±0.62	0.65	-0.006
p-Xylene		296.00 ±17.52	157.33 ±6.03	78.73 ±4.13	39.00 ±1.08	9.50 ±0.40	ND	ND	ND	ND	0.91	-0.057
Cumene		288.00 ±14.00	224.00 ±8.00	153.33 ±7.51	90.73 ±2.34	41.13 ±1.52	11.43 ±0.67	8.83 ±0.78	1.57 ±0.06	ND	0.95	-0.018
1,3,5-Trimethylbenzene		289.67 ±12.58	300.67 ±8.33	258.00 ±12.12	172.33 ±4.04	78.03 ±2.27	38.03 ±1.96	28.03 ±2.39	7.97 ±0.32	2.83 ±0.06	0.96	-0.012
Indan		294.67 ±11.06	224.67 ±5.51	210.00 ±8.66	238.33 ±4.04	104.67 ±2.52	52.87 ±2.57	34.80 ±2.76	7.80 ±0.26	1.33 ±0.06	0.99	-0.013
Naphthalene		313.33 ±8.33	279.67 ±7.51	295.67 ±8.96	253.67 ±1.15	301.33 ±3.79	281.00 ±14.73	249.00 ±12.77	145.33 ±3.79	64.23 ±0.95	0.87	-0.003
Methylnaphthalene		313.67 ±7.37	301.33 ±6.66	319.33 ±6.25	297.33 ±2.08	260.33 ±2.89	266.33 ±13.61	258.33 ±7.51	221.67 ±3.06	174.00 ±1.00	0.94	-0.001
n-Tetradecane		318.67 ±4.16	315.00 ±4.58	322.00 ±7.00	309.67 ±2.52	285.67 ±2.31	299.00 ±10.39	290.33 ±2.08	271.00 ±2.65	245.67 ±4.04	0.88	-0.001
2,3-Dimethylnaphthalene		321.67 ±4.16	321.00 ±4.58	334.67 ±7.23	316.00 ±2.00	295.67 ±2.31	312.00 ±9.64	313.33 ±3.06	311.33 ±2.52	306.00 ±3.06	0.18	-0.000

ND - non-detectable

TABLE E-26. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 8-10-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	175	r^2	Slope
Hexane		163.70 ±4.26	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		148.67 ±3.06	30.60 ±1.08	22.07 ±2.40	9.97 ±0.3[illegible]	6.40 ±0.17	4.23 ±0.06	6.27 ±0.99	4.03 ±0.15	3.20 ±0.10	0.49	-0.006
n-Heptane		116.10 ±0.85	35.40 ±1.18	29.60 ±2.21	22.03 ±0.55	21.27 ±0.47	12.80 ±0.61	9.57 ±0.90	9.87 ±0.35	8.93 ±0.29	0.56	-0.004
Methylcyclohexane		115.07 ±0.90	36.57 ±1.27	29.33 ±2.33	19.23 ±0.31	14.60 ±0.35	6.00 ±0.26	8.63 ±0.76	6.07 ±0.25	5.90 ±0.17	0.56	-0.005
Toluene		158.03 ±3.56	73.13 ±2.41	36.53 ±2.15	28.60 ±0.50	ND	ND	ND	ND	ND	0.85	-0.090
n-Octane		83.40 ±2.49	45.53 ±1.29	38.87 ±1.77	29.13 10.55	33.33 ±0.75	28.73 ±1.18	1[illegible].60 ±1.57	11.97 ±0.55	11.30 ±0.36	0.77	-0.004
Ethylcyclohexane		81.57 ±2.70	45.97 ±1.24	39.00 ±1.65	28.53 ±0.32	28.37 ±0.67	16.40 ±0.66	12.97 ±[illegible].25	12.90 ±0.60	12.33 ±0.40	0.65	-0.004
p-Xylene		96.20 ±3.90	62.53 ±1.53	43.37 ±1.50	19.17 ±0.29	10.73 ±0.25	6.17 ±0.31	7.77 ±1.52	3.80 ±0.20	1.60 ±0.00	0.80	-0.009
Cumene		75.23 ±3.27	55.37 ±1.15	44.37 ±1.33	26.10 ±0.35	19.07 ±0.50	8.27 ±0.38	10.57 ±1.45	6.97 ±0.12	6.37 ±0.15	0.71	-0.006
1,3,5-Trimethylbenzene		71.23 ±3.31	57.13 ±1.01	48.43 ±1.21	30.97 ±0.40	26.20 ±0.72	11.60 ±0.62	12.40 ±[illegible].73	8.50 ±0.36	8.23 ±0.21	0.75	-0.005
Indan		77.93 ±3.86	66.97 ±0.99	56.17 ±1.19	34.60 ±0.30	30.97 ±0.83	14.47 ±2.39	18.27 ±1.31	9.43 ±0.42	7.43 ±0.45	0.83	-0.006
Naphthalene		81.03 ±3.90	74.63 ±0.45	67.10 ±1.08	44.90 ±0.20	43.30 ±0.96	42.03 ±2.44	36.43 ±2.57	34.27 ±0.99	36.83 ±0.91	0.66	-0.002
2-Methylnaphthalene		68.87 ±2.95	65.53 ±0.38	64.30 ±0.95	45.23 ±0.29	60.60 ±0.78	56.53 ±2.54	41.80 ±2.34	38.37 ±0.87	24.30 ±0.56	0.84	-0.002
n-Tetradecane		63.73 ±1.55	67.30 ±0.46	53.43 ±0.67	52.30 ±0.30	82.00 ±0.53	56.13 ±1.40	22.83 ±0.67	25.30 ±0.66	18.70 ±0.26	0.77	-0.003
2,3-Dimethylnaphthalene		65.23 ±1.80	66.47 ±0.40	49.80 ±0.70	50.07 ±0.32	33.87 ±0.55	64.77 ±1.53	62.97 ±2.38	65.20 ±1.15	62.97 ±0.76	0.02	-0.000

ND = non-detectable

TABLE E-27. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 8-10-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	175	r^2	Slope
Hexane		293.33 ±20.21	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		321.00 ±25.94	32.63 ±1.46	4.33 ±0.21	3.20 ±0.17	2.00 ±0.00	ND	ND	ND	ND	0.49	0.067
n-Heptane		364.33 ±17.04	74.17 ±3.37	7.33 ±0.42	10.08 ±0.53	11.27 ±0.32	4.50 ±0.17	5.10 ±0.44	5.77 ±0.58	5.97 ±0.32	0.27	-0.006
Methylcyclohexane		367.00 ±16.26	65.20 ±2.97	6.87 ±0.66	8.27 ±0.17	5.50	ND	ND	ND	ND	0.44	-0.054
Toluene		393.67 ±16.26	61.30 ±2.97	13.10 ±0.66	3.00 ±0.17	ND	ND	ND	ND	ND	0.95	-0.259
n-Octane		401.67 ±17.01	110.00 ±5.29	14.70 ±0.72	13.47 ±0.63	19.03 ±0.86	12.33 ±0.55	13.63 ±1.06	22.27 ±1.42	11.53 ±0.67	0.20	-0.004
Ethylcyclohexane		404.67 ±16.50	118.00 ±6.08	20.87 ±0.97	20.87 ±1.12	22.60 ±0.72	6.47 ±0.31	7.23 ±0.50	8.07 ±1.02	5.60 ±0.36	0.46	-0.007
p-Xylene		410.00 ±15.39	171.67 ±8.14	77.13 ±4.01	35.03 ±1.99	2.40 ±0.10	ND	ND	ND	ND	0.96	-0.087
Cumene		406.00 ±14.11	241.00 ±11.27	159.33 ±8,33	90.83 ±4.59	17.97 0.65	ND	ND	ND	ND	0.97	-0.053
1,3,5-Trimethylbenzene		413.33 ±13.05	315.33 ±13.58	269.00 ±14.93	180.67 ±6.11	46.33 ±1.75	5.60 ±0.17	5.87 ±0.35	4.77 ±0.49	1.77 ±0.15	0.79	-0.014
Indan		419.67 ±11.50	355.67 ±13.32	330.67 ±18.93	252.67 ±11.37	72.83 ±3.10	12.60 ±0.44	17.87 ±0.80	12.70 ±1.23	9.03 [illegible]91	0.73	-0.010
Naphthalene		440.33 ±10.50	426.67 ±9.71	446.33 ±24.54	408.00 ±13.08	259.33 ±13.65	167.33 ±3.21	165.67 ±3.79	168.33 ±1.53	143.67 ±14.43	0.72	-0.003
2-Methylnaphthalene		448.33 ±6.51	454.33 ±7.37	477.67 ±20.26	455.00 ±7.94	346.00 ±15.39	273.33 ±4.51	269.33 ±2.89	233.67 ±5.13	61.50 ±5.46	0.89	-0.004
n-Tetradecane		451.33 ±1.53	468.67 ±4.62	479.33 ±11.68	476.33 ±3.06	374.00 ±7.94	316.33 ±4.73	298.67 ±1.15	279.00 ±3.00	73.23 ±3.93	0.86	-0.004
2,3-Dimethylnaphthalene		456.67 ±2.89	477.67 ±4.62	490.33 ±11.37	483.67 ±3.21	387.67 ±9.29	331.00 ±4.58	317.00 ±2.65	304.33 ±2.31	85.00 ±3.91	0.53	-0.006

ND = non-detectable

TABLE E-28. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 8-10-82 BAYOU CHICO QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	72	120	175	r^2	Slope
Hexane		166.00 ±5.57	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		151.67 ±4.16	28.93 ±1.52	30.27 ±2.27	31.57 ±0.92	19.60 ±3.15	8.77 ±1.15	6.87 ±0.25	5.03 ±0.06	1.60 ±0.17	0.82	-0.008
n-Heptane		122.33 ±2.31	35.20 ±1.32	33.47 ±1.64	23.83 ±0.81	19.60 ±2.13	18.20 ±3.60	11.97 ±0.25	11.33 ±0.55	4.30 ±0.36	0.73	-0.006
Methylcyclohexane		120.67 ±2.08	36.30 ±1.31	33.00 ±1.61	21.87 ±0.76	20.87 ±2.40	18.50 ±2.15	8.53 ±0.15	7.10 ±0.35	2.97 ±0.21	0.81	-0.007
Toluene		155.00 ±3.00	67.47 ±1.88	41.80 ±2.07	28.33 ±1.10	4.83 ±0.45	ND	ND	ND	ND	0.94	-0.056
n-Octane		93.73 ±1.82	45.97 ±1.10	27.07 ±1.38	31.23 ±1.12	26.27 ±2.61	23.10 ±2.25	23.20 ±0.17	22.27 ±1.42	8.93 ±0.49	0.64	-0.004
Ethylcyclohexane		92.03 ±1.78	46.70 ±1.13	27.23 ±1.36	30.80 ±1.15	24.93 ±2.62	24.67 ±3.16	15.10 ±0.20	13.43 ±0.84	5.20 ±0.26	0.81	-0.005
p-Xylene		101.00 ±2.00	60.23 ±1.72	27.27 ±1.38	24.33 ±0.95	23.67 ±0.21	11.40 ±0.32	10.57 ±0.23	4.73	4.83	0.76	-0.007
Cumene		84.50 ±1.84	55.97 ±1.86	32.77 ±1.10	31.20 ±1.25	20.40 ±1.60	22.17 ±1.66	11.93 ±0.23	8.30 ±0.53	3.03 ±0.15	0.90	-0.007
1,3,5-Trimethylbenzene		81.17 ±1.72	58.77 ±2.35	35.90 ±1.66	36.67 ±1.58	26.33 ±2.00	24.07 ±3.99	14.67 ±0.251	10.47 ±0.57	3.80 ±0.17	0.92	-0.006
Indan		85.60 ±1.65	67.37 ±3.15	40.80 ±1.74	41.73 ±1.97	31.57 ±1.07	36.77 ±2.09	16.77 ±3.70	11.50 ±0.53	3.33 ±0.15	0.93	-0.007
Naphthalene		88.63 ±0.92	73.97 ±4.01	50.00 ±1.06	53.73 ±3.00	50.00 ±2.81	74.47 ±1.13	48.50 ±0.46	74.47 ±1.13	48.50 ±0.46	0.70	-0.003
2-Methylnaphthalene		80.13 ±1.25	66.73 ±3.39	55.73 ±0.61	57.07 ±2.57	59.07 ±2.05	88.67 ±1.97	66.23 ±0.21	56.37 ±0.49	27.60 ±0.66	0.49	-0.002
n-Tetradecane		78.30 ±1.50	75.47 ±2.47	73.60 ±1.39	73.07 ±2.41	81.47 ±1.29	107.33 ±0.58	52.70 ±0.30	41.47 ±0.81	19.57 ±0.23	0.78	-0.003
2,3-Dimethylnaphthalene		78.33 ±1.45	69.57 ±2.20	69.20 ±1.06	69.33 ±2.20	81.07 ±1.29	137.67 ±1.53	140.00 ±1.00	133.00 ±1.73	62.10 ±0.53	0.04	+0.001

ND = non-detectable

TABLE E-29. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 8-18-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	76	120	168	r^2	Slope
Hexane		392.57 ±108.2	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		404.34 ±108.89	66.93 ±3.81	42.73 ±1.02	46.77 ±4.57	29.27 ±2.19	10.33 ±0.06	4.71 ±0.06	ND	ND	0.77	-.019
n-Heptane		540.57 ±99.36	105.93 ±6.55	80.67 ±2.25	95.63 ±7.29	76.73 ±11.74	48.43 ±0.40	20.87 ±0.29	ND	ND	0.69	-.011
Methylcyclohexane		427.17 ±92.93	103.53 ±7.65	74.07 ±1.55	88.03 ±4.97	47.57 ±6.44	16.40 10.10	5.09 ±5.04	ND	ND	0.88	-.020
Toluene		441.23 ±91.47	94.40 ±5.17	50.83 ±1.65	26.77 ±3.74	ND	ND	ND	ND	ND	0.85	-.141
n-Octane		445.07 ±86.15	143.63 ±7.99	110.83 ±3.93	126.03 ±11.06	109.63 ±15.25	84.00 ±1.11	44.27 ±1.90	8.93 ±0.48	9.10 ±1.59	0.88	-.009
Ethylcyclohexane		446.0 ±81.26	153.33 ±8.04	118.6 ±4.90	124.3 ±11.26	96.00 ±13.17	60.53 ±0.75	27.97 ±1.46	5.07 ±0.28	4.47 ±0.71	0.92	-.011
p-Xylene		448.23 ±75.26	206.30 ±9.70	168.17 ±8.08	130.77 ±18.46	18.63 ±2.56	ND	ND	ND	ND	0.96	-.052
Cumene		447.40 ±69.18	266.33 ±10.53	241.7 ±12.19	199.73 ±27.35	62.40 ±8.64	10.70 ±0.10	2.36 ±0.15	ND	ND	0.99	-.029
1,3,5-Trimethylbenzene		449.03 ±62.05	335.60 ±10.78	327.53 ±16.22	274.67 ±36.50	120.17 ±15.99	36.33 ±0.21	9.42 ±0.80	ND	ND	1.00	-.022
Indan		453.6 ±56.60	382.37 ±9.52	382.17 ±17.44	326.27 ±44.77	170.43 ±21.51	44.60 ±1.44	8.04 ±0.77	ND	ND	0.99	-.023
Naphthalene		474.00 ±13.72	476.57 ±7.58	478.42 ±8.86	434.93 ±52.25	389.37 ±40.30	295.47 ±7.11	382.87 ±13.98	62.60 ±2.62	47.00 ±5.16	0.97	-.007
2-Methylnaphthalene		353.23 ±165.63	505.43 19.23	506.23 ±3.39	463.13 ±44.23	470.63 ±36.53	429.10 ±9.66	285.40 ±26.84	249.63 ±9.90	232.73 ±19.99	0.54	-.002
n-Tetradecane		429.27 ±16.10	511.37 ±7.60	510.67 ±9.07	469.83 ±28.55	499.83 ±21.49	460.20 ±8.11	345.30 ±22.27	349.23 ±9.48	343.10 ±17.20	0.70	-.001
2,3-Dimethylnaphthalene		466.47 ±15.77	522.77 ±5.41	523.17 ±8.47	483.97 ±28.60	510.33 ±30.33	495.80 ±9.43	396.93 ±21.74	451.40 ±9.61	450.67 ±21.51	0.30	-.005

ND = non-detectable

TABLE E-30. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 8-18-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	76	120	168	r^2	Slope
Hexane		195.03 ±16.56	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		183.43 ±12.51	17.17 ±1.78	16.40 ±1.22	11.50 ±1.14	5.57 ±0.58	9.30 ±0.61	4.44 ±0.59	2.26 ±0.29	ND	0.54	0.01
n-Heptane		159.80 ±13.41	17.90 ±2.30	20.70 ±1.95	15.50 ±2.29	10.20 ±1.73	18.87 ±0.42	10.08 ±1.23	12.50 ±0.40	8.88 ±0.85	0.28	0.003
Methylcyclohexane		159.20 ±10.38	20.50 ±1.84	21.07 ±1.87	14.70 ±1.92	7.93 ±1.33	14.93 10.15	7.11 10.76	6.68 ±0.73	4.54 ±0.32	0.97	-0.005
Toluene		196.17 ±12.46	42.57 ±3.31	39.23 ±2.84	14.70 ±1.92	7.93 ±1.33	5.53 ±0.06	ND	ND	ND	0.66	-0.025
n-Octane		140.83 ±8.81	27.03 ±2.12	26.37 ±1.85	19.90 ±1.83	15.20 ±2.51	28.63 ±0.45	19.70 ±1.68	26.13 ±1.21	18.70 ±1.95	0.12	-0.002
Ethylcyclohexane		140.3 ±8.30	28.17 ±2.17	27.03 ±1.62	19.77 ±1.68	13.80 ±2.25	24.07 ±0.35	12.73 ±1.01	16.03 ±0.75	10.51 ±1.04	0.35	-0.004
p-Xylene		151.17 ±8.59	42.77 ±3.29	39.67 ±2.02	29.27 ±2.24	11.63 ±1.93	13.43 10.21	5.55 ±0.35	1.56 10.13	ND	0.86	-0.052
Cumene		136.63 ±6.76	39.23 ±3.04	35.77 ±1.44	27.17 ±1.82	13.90 ±2.25	17.07 10.32	8.01 ±0.40	4.28 ±0.36	3.92 ±0.43	0.76	-0.007
1,3,5-Trimethylbenzene		134.13 ±5.64	43.80 ±3.34	38.63 ±1.17	31.63 ±1.72	19.57 ±3.01	22.23 ±0.25	10.30 ±0.44	7.26 ±0.52	5.31 ±0.53	0.78	-0.006
Indan		139.70 ±4.56	53.03 ±3.88	56.00 ±1.91	41.30 ±4.14	27.97 ±0.32	25.83 ±0.26	10.90 ±0.30	5.18 ±0.42	4.23	0.88	-0.008
Naphthalene		136.23 ±2.52	63.73 ±3.78	63.37 ±2.23	51.77 ±2.04	49.70 ±5.54	62.07 ±0.97	39.10 ±0.50	33.93 ±0.72	28.33 ±2.73	0.63	-0.003
2-Methylnaphthalene		123.63 ±2.06	62.85 ±3.09	53.63 ±1.10	45.80 ±1.61	51.67 ±4.47	73.83 ±1.24	65.63 ±1.85	76.27 ±2.26	81.00 ±6.80	0.06	-0.006
n-Tetradecane		117.20 ±1.49	88.23 ±2.65	71.00 10.75	63.77 ±1.66	71.03 ±3.02	60.17 ±0.59	42.43 ±1.34	58.77 ±2.16	45.13 ±2.45	0.54	-0.002
2,3-Dimethylnaphthalene		119.13 ±1.67	73.93 ±2.83	57.73 ±0.57	61.63 ±1.71	88.27 ±5.90	123.23 ±2.11	140.13 ±10.50	171.50 ±10.05	196.80 ±18.62	0.72	-0.003

ND = non-detectable

TABLE E-31. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 8-18-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	76	120	168	r^2	Slope
Hexane		317.17 ±39.16	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		309.10 ±36.49	46.00 ±2.49	4.87 ±0.15	6.88 ±0.13	ND	ND	ND	ND	ND	0.69	-0.203
n-Heptane		306.17 ±32.48	139.23 ±8.80	82.23 ±4.60	80.37 ±1.91	26.03 ±4.02	12.87 ±0.12	3.62 ±0.60	ND	ND	0.92	-0.022
Methylcyclohexane		299.47 ±30.82	110.30 ±8.05	39.24 ±1.60	44.83 ±2.44	4.13 ±1.18	2.07 ±0.06	ND	ND	ND	0.88	-0.046
Toluene		313.87 ±30.87	98.47 ±6.43	38.00 ±2.14	14.67 ±0.75	ND	ND	ND	ND	ND	0.95	-0.163
n-Octane		298.30 ±27.73	201.50 ±14.09	155.50 ±8.94	161.00 ±3.58	72.53 ±9.41	51.40 ±0.72	23.97 ±3.23	9.54 ±1.62	6.55 ±0.30	0.94	-0.01
Ethylcyclohexane		287.93 ±26.86	202.4 ±14.63	138.8 ±8.06	137.40 ±7.00	36.87 ±4.62	20.03 ±0.25	6.44 ±0.82	ND	ND	0.95	-0.021
p-Xylene		290.43 ±26.00	242.63 ±17.48	163.41 ±10.13	107.60 ±5.35	6.60 ±0.78	ND	ND	ND	ND	0.99	-0.070
Cumene		306.93 ±22.22	306.6 ±22.66	248.33 115.57	191.70 ±8.26	33.87 ±4.03	3.27 ±0.12	ND	ND	ND	1.00	-0.042
1,3,5-Trimethylbenzene		285.20 ±20.40	368.43 ±26.86	313.73 ±13.86	269.03 ±2.84	95.13 ±11.09	19.30 ±0.46	2.53 ±0.29	1.56 ±0.25	ND	0.95	-0.022
Indan		289.37 ±16.59	408.90 ±29.04	354.90 ±14.43	325.07 ±5.17	145.30 ±16.21	33.90 ±1.04	±2.87 10.31	ND	ND	0.97	-0.027
Naphthalene		287.37 ±6.01	475.53 ±24.02	431.17 ±8.12	436.30 ±22.92	306.10 ±26.44	220.50 ±10.04	114.17 ±9.81	70.33 ±9.13	50.40 ±1.06	0.94	-0.006
2-Methylnaphthalene		275.80 ±2.26	494.63 ±19.26	450.83 ±0.85	466.70 ±32.91	357.90 ±21.21	312.07 ±13.58	243.17 ±15.56	283.00 ±20.77	229.7 ±3.40	0.45	-0.003
n-Tetradecane		268.53 ±5.26	505.23 ±16.08	465.23 ±4.51	480.67 ±34.55	382.57 ±11.09	337.20 ±11.98	274.13 ±9.41	392.83 ±6.18	304.73 ±5.34	0.17	-0.001
2,3-Dimethylnaphthalene		272.37 ±3.50	515.43 114.02	481.23 ±1.59	493.43 ±32.33	401.60 ±12.47	377.80 ±10.58	340.97 ±11.36	477.47 ±12.86	444.03 16.22	0.01	-0.0003

ND = non-detectable

AD-A139 791 DEGRADATION OF JET FUEL HYDROCARBONS BY AQUATIC MICROBIAL COMMUNITIES(U) AIR FORCE ENGINEERING AND SERVICES CENTER TYDALL AFB FL ENGIN.. J C SPAIN ET AL. 3/3

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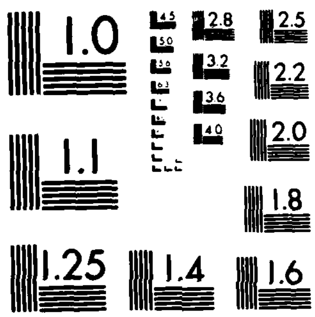

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TABLE E-32. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 8-18-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, MODEL FUEL

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	76	120	168	r^2	Slope
Hexane		392.53 ±33.32	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		410.67 ±32.04	47.73 ±2.95	47.87 ±3.17	37.07 ±0.91	5.10 ±1.20	2.90 ±0.29	7.41 ±0.30	ND	ND	0.53	-0.019
n-Heptane		392.53 ±33.32	67.97 ±3.79	75.20 ±7.14	67.53 ±3.32	14.33 ±2.80	32.00 ±2.59	14.27 ±0.64	9.45 ±0.35	8.45 ±0.85	0.53	-0.019
Methylcyclohexane		463.93 ±26.20	66.77 ±3.38	69.53 ±6.17	72.00 ±2.95	10.20 ±1.82	14.33 ±0.95	9.43 ±0.57	3.94 ±0.10	3.89 ±0.18	0.68	-0.010
Toluene		457.83 ±24.46	75.70 ±3.54	69.57 ±4.66	35.73 ±0.90	6.33 ±1.07	ND	ND	ND	ND	0.84	-0.064
n-Octane		458.00 ±23.91	89.73 ±3.75	103.13 ±6.70	106.37 ±2.59	22.67 ±3.74	56.07 ±3.61	26.07 ±1.29	25.93 ±0.32	28.17 ±1.21	0.43	-0.005
Ethylcyclohexane		45.93 ±22.80	92.67 ±3.66	103.40 ±6.68	102.23 ±2.82	19.77 ±3.25	40.87 ±2.40	17.83 ±0.91	12.50 ±0.26	10.13 ±1.19	0.66	-0.007
p-Xylene		458.40 ±21.60	102.00 ±4.08	105.70 ±6.97	74.60 ±2.46	11.63 ±1.89	4.10 ±0.30	ND	ND	ND	0.89	-0.004
Cumene		456.67 ±20.64	117.60 ±3.55	118.43 ±7.79	100.73 ±3.51	18.63 ±3.02	16.57 ±1.11	12.03 ±0.50	4.06 ±0.07	3.61 10.48	0.79	-0.011
1,3,5-Trimethylbenzene		456.87 ±20.71	134.6 ±3.16	133.77 ±7.80	126.80 ±9.24	29.33 ±4.63	32.43 ±1.58	14.93 ±0.67	6.12 ±0.29	5.19 ±0.68	0.83	-0.01
Indan		458.97 ±18.98	151.40 ±2.80	150.50 ±7.23	141.83 ±4.76	35.00 ±3.86	43.73 ±2.27	18.20 ±0.87	5.99 ±0.19	4.16 ±0.52	0.88	-0.011
Naphthalene		448.17 ±10.30	180.03 ±1.61	170.90 ±4.14	159.10 ±4.01	66.30 ±7.55	120.27 ±7.06	58.83 ±2.37	44.43 ±1.76	35.77 ±3.09	0.71	-0.005
2-Methylnaphthalene		434.83 ±4.03	192.03 ±1.45	167.93 ±3.13	168.20 ±2.48	80.03 ±5.81	147.40 ±8.59	93.47 12.60	100.70 ±4.94	102.67 15.38	0.33	-0.002
n-Tetradacane		417.10 ±1.29	222.70 ±0.62	199.33 ±4.94	216.33 ±2.69	130.23 ±4.41	174.40 ±7.98	80.13 ±1.27	76.70 ±3.54	100.60 ±6.09	0.60	-0.003
2,3-Dimethylnaphthalene		427.60 ±3.16	214.17 ±1.08	187.37 ±3.97	199.00 ±1.25	124.63 ±4.48	211.90 ±10.98	181.63 ±1.91	227.57 ±8.79	234.95 ±19.14	0.00	-0.0001

ND = non-detectable

APPENDIX F

DATA TABLES - JP-4

6-30-82 - 10-15-82

TABLE F-1. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 6-30-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, JP-4

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	2	4	8	24	48	76	120	168	r^2	Slope
Benzene	2.56 ±0.12	1.40 ±0.24	1.36 ±0.16	0.89 ±0.05	0.16 ±0.03	ND	ND	ND	ND	0.97	-0.0463
Toluene	1.91 ±1.17	1.58 ±0.24	1.68 ±0.25	1.13 ±0.08	0.31 0.06	ND	ND	ND	ND	0.85	-0.0248
p-Xylene	0.17 ±0.14	0.09 ±0.02	0.09 ±0.03	0.05 ±0.01	0.01 ±0.01	ND	ND	ND	ND	0.76	-0.0509

ND = non-detectable

TABLE F-2. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 6-30-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, JP-4

	Concentration (mg/ℓ)										
Compound / Time (Hours)	0	2	4	8	24	48	76	120	168	r^2	Slope
Benzene	2.02 ±0.44	1.35 ±0.06	1.38 ±0.13	1.00 ±0.11	0.10 ±0.01	ND	ND	ND	ND	0.97	-0.061
Toluene	2.94 ±0.25	1.61 ±0.09	1.65 ±0.16	1.79 ±0.11	0.15 ±0.03	ND	ND	ND	ND	0.85	-0.0249
p-Xylene	0.15 ±0.03	0.11 ±0.03	0.08 ±0.01	0.06 ±0.01	ND	ND	ND	ND	ND	0.90	-0.06738

ND = non-detectable

TABLE F-3. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 6-30-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, JP-4

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	2	4	8	24	48	76	120	168	r^2	Slope
Benzene		1.94 ±0.06	1.16 ±0.14	1.42 ±0.07	1.03 ±0.08	0.18 ±0.06	ND	ND	ND	ND	0.95	-0.0419
Toluene		2.63 ±0.10	1.34 ±0.14	1.82 ±0.15	1.24 ±0.17	0.43 0.10	ND	ND	ND	ND	0.91	-0.03198
p-Xylene		0.15 ±0.01	0.08 ±0.01	0.10 ±0.01	0.08 ±0.03	.018 ±.004	ND	ND	ND	ND	0.75	-0.0456

ND = non-detectable

TABLE F-4. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 6-30-82 ESCAMBIA RIVER SHAKEN FATE SCREEN, JP-4

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	2	4	8	24	48	76	120	168	r^2	Slope
Benzene		1.72 ±0.00	1.23 ±0.09	1.12 ±0.46	1.06 ±0.18	0.13 ±0.02	ND	ND	ND	ND	0.97	-0.0463
Toluene		2.38 ±0.10	1.53 ±0.13	1.71 ±0.12	1.19 ±0.20	0.22 ±0.07	ND	ND	ND	ND	0.95	-0.0425
p-Xylene		0.13 ±0.01	0.08 ±0.01	0.09 ±0.02	0.10 ±0.03	0.02 ±0.02	ND	ND	ND	ND	0.70	-0.0486

ND = non-detectable

TABLE F-5. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 6-30-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		18.47 ±0.42	9.67 ±3.01	5.20 ±1.91	ND	ND	ND	ND	ND	ND	0.81	-.144
Cyclohexane		69.30 ±2.67	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		85.80 ±4.57	9.97 ±4.55	3.50 ±0.40	2.30 ±0.00	ND	ND	ND	ND	ND	0.76	-.181
Ethylbenzene		25.70 ±1.30	7.47 ±0.99	4.17 ±0.21	0.96 ±0.14	ND	ND	ND	ND	ND	0.95	-.198
p-Xylene		24.87 ±1.45	8.07 ±0.64	5.03 ±0.15	1.23 ±0.06	ND	ND	ND	ND	ND	0.98	-.157
1-Methyl,3-ethylbenzene		28.47 ±6.99	21.70 ±0.62	18.13 ±0.31	9.23 ±0.15	2.00 ±0.10	ND	ND	ND	ND	0.98	-.048
1,2,4-Trimethylbenzene		77.30 ±3.59	50.77 ±1.19	43.13 ±0.29	29.07 ±1.06	9.73 ±0.38	ND	ND	ND	ND	0.97	-.038
n-Decane		160.80 ±6.66	124.37 ±2.71	118.47 ±0.96	86.30 ±1.45	39.40 ±1.55	ND	ND	ND	ND	0.98	-.024
1,4-Dimethyl,2-ethylbenzene		50.93 ±2.15	44.43 ±0.95	43.23 ±0.42	36.53 ±0.47	20.70 ±2.89	3.93 ±1.02	2.50 ±0.44	ND	ND	0.97	-.020
n-Undecane		171.20 ±6.58	153.77 ±3.78	155.77 ±1.91	138.97 ±2.10	100.80 ±1.55	35.70 ±1.71	14.93 ±0.49	3.33 ±0.35	ND	0.99	-.015
Naphthalene		36.80 ±1.44	33.80 ±0.87	34.43 ±0.32	31.30 ±0.76	25.30 ±0.26	13.13 ±0.71	5.77 ±0.32	ND	ND	0.98	-.011
n-Dodecane		164.07 ±10.13	146.03 ±6.88	164.70 ±0.70	156.60 ±0.96	126.37 ±9.23	87.87 ±5.86	43.20 ±0.21	6.0 ±0.35	5.17 ±0.06	0.95	-.010
2-Methylnaphthalene		40.03 ±1.52	37.07 ±0.61	40.37 ±0.72	38.60 ±0.50	33.80 ±0.66	25.43 ±0.65	14.40 ±0.70	2.90 ±0.17	3.66 ±0.31	0.92	-.007
n-Tridecane		110.53 ±2.04	107.63 ±3.71	114.57 ±2.35	112.40 ±8.12	103.47 ±2.25	89.07 ±3.48	53.87 ±0.61	22.80 ±0.79	30.17 ±0.85	0.88	-.004
n-Tetradecane		54.63 ±1.98	51.23 ±0.58	56.30 ±0.50	55.07 ±0.23	50.20 ±0.44	47.43 ±1.07	27.37 ±2.68	24.17 ±0.31	32.50 ±0.71	0.68	-.002

ND = non-detectable

TABLE F-6. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 6-30-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5000 mg/l

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		17.70 ±1.14	10.90 ±2.00	2.90 ±0.44	ND	ND	ND	ND	ND	ND	0.92	-.197
Cyclohexane		64.97 ±1.37	8.03 ±1.71	ND	ND	ND	ND	ND	ND	ND	0.99	-.457
Toluene		83.47 ±3.24	17.03 ±4.28	5.93 ±0.81	ND	ND	ND	ND	ND	ND	0.97	-.288
Ethylbenzene		25.07 ±0.76	8.87 ±1.22	4.23 ±0.21	3.83 ±1.88	ND	ND	ND	ND	ND	0.73	-.102
p-Xylene		24.60 ±1.06	8.93 ±0.71	4.67 ±0.15	2.93 ±1.16	ND	ND	ND	ND	ND	0.86	-.114
1-Methyl,3-ethylbenzene		34.53 ±1.05	21.00 ±1.42	15.77 ±0.50	11.07 ±1.79	ND	ND	ND	ND	ND	0.91	-.060
1,2,4-Trimethylbenzene		73.50 ±3.60	50.77 ±4.66	39.00 ±0.87	30.23 ±2.93	3.70 ±0.36	ND	ND	ND	ND	0.99	-.053
n-Decane		155.23 ±4.11	116.10 ±4.34	104.90 ±3.46	86.27 ±4.40	19.57 ±0.91	10.03 ±0.31	4.30 ±0.20	ND	ND	0.95	-.022
1,4-Dimethyl,2-ethylbenzene		49.63 ±1.44	41.23 ±2.23	38.83 ±1.31	37.43 ±2.80	15.10 ±0.78	8.97 ±0.23	1.62 ±0.27	1.46 ±0.47	ND	0.91	-.014
n-Undecane		166.27 ±4.21	142.50 ±5.57	141.31 ±4.48	140.85 ±3.46	77.93 ±1.91	57.27 ±0.71	14.57 ±1.85	6.67 ±0.87	6.87 ±0.35	0.91	-.009
Naphthalene		35.37 ±0.91	31.37 ±2.27	31.20 ±1.05	31.93 ±1.95	21.07 ±0.55	16.67 ±0.15	6.73 ±0.47	2.67 ±0.35	1.72 ±0.44	0.97	-.008
n-Dodecane		152.20 ±7.79	135.78 ±12.28	151.70 ±5.15	155.47 ±7.75	122.93 ±3.40	109.67 ±5.89	59.03 ±1.22	32.40 ±0.46	12.50 ±0.46	0.83	-.007
2-Methylnaphthalene		38.93 ±0.45	34.17 ±2.94	39.08 ±3.08	38.83 ±2.48	32.13 ±0.50	25.23 ±5.74	13.17 ±4.30	6.33 ±3.75	4.57 ±1.37	0.90	-.006
n-Tridecane		105.47 ±0.12	100.43 ±7.66	109.13 ±3.21	105.73 ±4.19	98.63 ±1.67	97.33 ±3.21	78.90 ±0.89	56.33 ±1.08	38.27 ±0.40	0.95	-.003
n-Tetradecane		52.90 ±0.61	47.40 ±5.05	52.57 ±2.02	53.80 ±3.22	50.53 ±0.97	49.73 ±1.07	44.70 ±0.90	39.67 ±1.50	36.73 ±1.00	0.82	-.001

ND = non-detectable

TABLE F-7. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 6-30-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		20.10 ±1.08	7.07 ±1.42	5.13 ±2.02	ND	ND	ND	ND	ND	ND	0.80	-.155
Cyclohexane		70.93 ±1.96	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		84.43 ±0.32	5.97 ±1.05	4.63 ±3.02	2.22 ±0.06	ND	ND	ND	ND	ND	0.68	-0.171
Ethylbenzene		25.00 ±0.20	5.60 ±0.53	3.43 ±0.92	1.60 ±0.20	ND	ND	ND	ND	ND	0.86	-.138
p-Xylene		24.17 ±0.21	6.37 ±0.49	3.93 ±0.58	1.70 ±0.10	ND	ND	ND	ND	ND	0.90	-.135
1-Methyl,3-ethylbenzene		34.23 ±0.59	18.87 ±1.10	16.17 ±0.86	10.60 ±0.50	1.77 ±0.23	ND	ND	ND	ND	0.98	-.051
1,2,4-Trimethylbenzene		69.13 ±1.01	46.30 ±0.10	41.73 ±2.44	31.37 ±3.27	9.20 ±1.25	2.87 ±0.51	ND	ND	ND	0.98	-.028
n-Decane		153.43 ±2.05	113.43 ±4.36	110.07 ±3.51	89.17 ±5.39	41.83 ±2.60	18.43 ±1.50	ND	ND	ND	0.98	-.018
1,4-Dimethyl,2-ethylbenzene		48.73 ±0.86	41.00 ±1.65	41.97 ±1.46	36.53 ±2.05	23.73 ±1.69	10.43 ±1.81	ND	ND	ND	0.98	-.014
n-Undecane		164.13 ±2.14	144.77 ±5.00	151.17 ±3.44	135.00 ±8.00	108.37 ±5.69	70.07 ±2.12	8.90 ±0.79	8.73 ±0.31	8.23 ±0.21	0.91	-.009
Naphthalene		35.17 ±0.71	31.93 ±0.93	34.50 ±1.22	30.87 ±1.55	26.77 ±1.91	20.27 ±0.42	5.63 ±0.15	1.96 ±0.12	1.54 ±0.06	0.95	-.009
n-Dodecane		149.57 ±8.62	146.17 ±3.67	159.53 ±13.81	152.23 ±5.87	143.13 ±7.18	122.17 ±1.62	51.37 ±0.90	27.20 ±0.20	11.37 ±0.06	0.96	-.005
2-Methylnaphthalene		34.73 ±5.61	35.67 ±0.80	41.50 ±1.05	37.17 ±1.72	36.07 ±2.57	31.73 ±1.10	16.10 ±3.73	10.00 ±2.51	3.23 ±1.18	0.91	-.006
n-Tridecane		103.30 ±2.17	104.13 ±3.34	116.60 ±2.95	102.47 ±4.56	105.73 ±5.82	99.70 ±3.10	72.33 ±0.42	57.53 ±0.61	35.57 ±1.88	0.93	-.003
n-Tetradecane		51.43 ±0.70	50.50 ±1.25	57.73 ±1.62	52.27 ±2.06	52.03 ±3.26	50.53 ±1.01	40.67 ±0.74	37.90 ±4.16	32.13 ±0.45	0.88	-.001

ND = non-detectable

TABLE F-8. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 6-30-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5000 mg/l

	Concentration (mg/l)										
Compound / Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene	18.67 ±0.76	6.53 ±0.32	2.47 ±0.32	ND	ND	ND	ND	ND	ND	0.99	-.220
Cyclohexane	66.93 ±2.89	13.30 ±0.35	6.43 ±0.67	ND	ND	ND	ND	ND	ND	0.94	-0.004
Toluene	81.67 ±7.76	7.40 ±0.26	6.93 ±0.64	6.53 ±0.25	ND	ND	ND	ND	ND	0.77	-.268
Ethylbenzene	26.20 ±1.25	6.50 10.44	4.90 ±0.36	8.87 ±0.40	2.23 ±0.15	5.73 ±1.88	4.90 ±0.44	2.47 ±0.12	2.67 ±0.25	0.36	-.003
p-Xylene	24.80 ±0.53	7.17 ±0.40	5.30 ±0.44	7.13 ±0.31	1.01 ±0.08	2.07 ±0.81	1.57 ±0.15	ND	ND	0.45	-.012
1-Methyl,3-ethylbenzene	35.90 ±0.89	19.30 ±0.96	15.77 ±1.03	17.07 ±0.65	2.77 ±0.15	4.43 ±2.14	2.43 ±0.40	ND	ND	0.73	-.015
1,2,4-Trimethylbenzene	73.77 ±2.21	46.60 ±4.50	37.93 ±1.21	41.53 ±3.28	9.50 ±0.56	8.30 ±1.84	6.20 ±3.03	2.00 ±0.70	3.57 ±0.47	0.75	-.008
n-Decane	158.70 ±0.75	112.77 ±4.97	102.47 ±5.77	105.20 ±3.36	33.07 ±1.74	31.63 ±3.44	31.07 ±0.78	ND	ND	0.75	-.010
1,4-Dimethyl,2-ethylbenzene	51.47 ±0.76	40.23 ±1.62	37.83 ±1.86	40.27 ±0.96	18.80 ±1.05	11.80 ±2.12	9.77 ±0.40	3.60 ±0.72	3.87 ±0.87	0.90	-.007
n-Undecane	169.20 ±1.42	142.13 ±5.41	137.43 ±6.07	147.30 ±3.05	88.23 ±4.00	45.57 ±5.83	32.57 ±0.32	19.47 ±0.61	19.47 ±1.10	0.89	-.006
Naphthalene	36.87 ±0.25	31.30 ±1.21	30.17 ±0.95	33.13 ±0.80	22.77 ±1.37	14.13 ±1.60	8.90 ±0.17	5.23 ±0.31	3.60 ±0.17	0.97	-.006
n-Dodecane	168.67 ±1.35	143.60 ±5.07	142.47 ±6.40	153.87 ±10.55	121.50 ±13.00	76.80 ±1.49	46.83 ±0.65	42.43 ±1.21	21.03 ±0.29	0.96	-.005
2-Methylnaphthalene	40.77 ±1.07	35.53 ±0.75	36.37 ±1.17	39.10 ±0.85	31.73 ±2.11	22.83 ±2.60	15.70 ±2.95	14.53 ±0.90	8.83 ±0.40	0.94	-.004
n-Tridecane	106.07 ±2.25	106.53 ±2.05	104.57 ±0.85	106.83 ±1.65	95.83 ±3.51	71.57 ±4.35	57.80 ±2.51	60.17 ±1.46	39.97 ±0.70	0.93	-.003
n-Tetradecane	54.23 ±1.25	50.70 ±0.66	51.37 ±0.40	54.27 ±0.23	46.37 ±3.87	36.10 ±3.48	31.93 ±0.81	34.73 ±3.32	34.10 ±0.75	0.66	-.001

ND = non-detectable

TABLE F-9. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 7-28-82 RANGE POINT SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		1.40 ±0.10	1.21 ±0.17	0.17 ±0.01	0.40 ±0.04	0.08 ±0.03	ND	ND	ND	ND	0.67	-.047
Toluene		2.39 ±0.07	2.25 ±0.19	0.57 ±0.04	0.54 ±0.16	0.21 ±0.08	0.05 ±0.04	ND	ND	ND	0.85	-.036
p-Xylene		0.14 ±0.00	0.10 ±0.00	0.01 ±0.00	0.03 ±0.00	ND	ND	ND	ND	ND	0.39	-.090

ND = non-detectable

TABLE F-10. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 7-28-82 RANGE POINT SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		0.94 ±0.11	1.16 ±0.06	0.18 ±0.03	0.40 ±0.04	0.07 ±0.06	ND	ND	ND	ND	0.69	-.048
Toluene		1.61 ±0.11	1.26 ±0.02	0.49 ±0.11	0.54 ±0.05	0.11 ±0.05	ND	ND	ND	ND	0.88	-.047
p-Xylene		0.09 ±0.01	0.10 ±0.02	0.02 ±0.01	0.03 ±0.00	ND	ND	ND	ND	ND	0.46	-.073

ND = non-detectable

TABLE F-11. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 7-28-82 RANGE POINT SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		1.00 ±0.02	1.10 ±0.03	0.24 ±0.02	0.46 ±0.05	0.05 ±0.04	ND	ND	ND	ND	0.83	-.056
Toluene		1.72 ±0.04	1.94 ±0.12	0.72 ±0.03	0.67 ±0.08	0.15 ±0.01	0.07 ±0.04	ND	ND	ND	0.88	-.030
p-Xylene		0.08 ±0.01	0.08 ±0.01	0.02 ±0.01	0.03 ±0.00	ND	ND	ND	ND	ND	0.37	-.059

ND - non-detectable

TABLE F-12. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 7-28-82 RANGE POINT SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		0.95 ±0.08	1.15 ±0.03	0.22 ±0.02	0.34 ±0.04	0.08 ±0.06	ND	ND	ND	ND	0.74	-.045
Toluene		1.63 ±0.11	1.15 ±-0.03	0.60 ±-0.02	0.57 1-0.03	0.06 -±0.03	ND	ND	ND	ND	0.96	-.060
p-Xylene		0.09 ±0.01	0.09 ±0.00	0.02 ±0.00	0.03 ±0.00	ND	ND	ND	ND	ND	0.64	-.075

ND = non-detectable

TABLE F-13. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 7-28-82 RANGE POINT QUIESCENT FATE SCREEN, JP-4

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		21.33 ±3.03	5.87 ±1.71	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		67.17 ±6.15	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		93.23 ±6.59	30.97 ±2.14	3.67 ±0.55	ND	ND	ND	ND	ND	ND	0.99	-0.352
Ethylbenzene		28.23 ±1.89	7.17 ±0.15	3.97 ±0.31	1.21 ±0.18	ND	ND	ND	ND	ND	0.95	-0.163
p-Xylene		26.90 ±1.71	13.93 ±0.21	4.57 ±0.21	1.56 ±0.13	0.60 ±0.12	ND	ND	ND	ND	0.80	-0.063
1-Methyl,3-ethylbenzene		39.07 ±2.47	19.93 ±0.21	16.73 ±0.61	10.23 ±0.64	1.31 ±0.19	ND	ND	ND	ND	0.98	-0.058
1,2,4-Trimethylbenzene		80.57 ±5.37	47.60 ±1.82	43.03 ±3.33	30.37 ±2.92	4.17 ±0.47	ND	ND	ND	ND	0.99	-0.051
n-Decane		173.47 ±10.68	113.10 ±0.44	108.97 ±2.37	84.30 ±3.37	28.97 ±1.23	15.10 ±0.10	ND	ND	ND	0.95	-0.021
1,4-Dimethyl,2-ethylbenzene		55.07 ±3.23	40.20 ±0.30	40.77 ±1.05	34.60 ±1.40	15.10 ±0.10	1.62 ±0.18	ND	ND	ND	0.97	-0.031
n-Undecane		180.73 ±10.55	139.03 ±1.68	144.03 ±2.91	129.13 ±4.94	60.37 ±1.86	32.43 ±1.20	2.30 ±0.00	ND	ND	0.93	-0.023
Naphthalene		38.73 ±1.89	30.93 ±0.45	32.00 ±0.46	29.67 ±1.02	18.33 ±0.49	6.77 ±0.57	2.37 ±0.15	ND	ND	0.99	-0.016
n-Dodecane		173.83 ±7.79	131.93 ±9.87	133.47 ±1.88	127.07 ±3.65	104.20 ±5.55	46.03 ±0.45	28.97 ±1.32	9.97 ±1.17	2.03 ±0.60	0.99	-0.011
2-Methylnaphthalene		41.60 ±1.61	35.70 ±0.20	37.03 ±0.64	37.03 ±0.81	29.73 ±0.76	16.67 ±1.43	12.13 ±0.42	3.80 ±0.41	ND	0.97	-0.008
n-Tridecane		116.03 ±3.26	99.63 ±1.65	104.40 ±3.18	101.00 ±1.92	95.90 ±2.35	54.13 ±1.85	58.37 ±1.63	33.43 ±1.69	3.83 ±1.37	0.86	-0.007
n-Tetradecane		54.37 ±0.35	47.97 ±0.32	49.47 ±0.57	51.30 ±1.28	64.20 ±25.47	37.67 ±0.96	36.63 ±4.41	28.83 ±0.85	7.87 ±2.99	0.78	-0.004

ND = non-detectable

TABLE F-14. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 7-28-82 RANGE POINT QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 4050 mg/l

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		22.17 ±1.07	9.97 ±0.50	3.87 ±0.06	ND	ND	ND	ND	ND	ND	1.00	-0.190
Cyclohexane		74.43 ±2.84	18.17 ±0.64	15.80 ±0.85	7.00 ±0.20	ND	ND	ND	ND	ND	0.85	-0.115
Toluene		91.03 ±2.22	82.53 ±2.25	15.90 ±0.46	6.40 ±0.20	ND	ND	ND	ND	ND	0.91	-0.157
Ethylbenzene		26.50 ±0.56	9.63 ±0.25	10.43 ±0.51	6.43 ±0.12	8.57 ±0.12	6.70 ±0.61	4.93 ±0.64	5.07 ±0.31	2.00 ±0.04	0.70	-0.004
p-Xylene		25.27 ±0.42	7.90 ±0.20	9.37 ±0.50	4.50 ±0.20	3.90 ±0.10	2.19 ±0.21	1.52 ±0.22	1.54 ±0.13	0.58 ±0.01	0.78	-0.007
1-Methyl,3-ethylbenzene		35.87 ±0.81	22.13 ±0.45	18.67 ±1.03	11.00 ±0.40	8.27 ±0.29	3.67 ±0.32	1.93 ±0.21	1.57 ±0.34	1.94 ±0.55	0.81	-0.008
1,2,4-Trimethylbenzene		77.97 ±2.25	49.00 ±1.15	43.03 ±1.55	27.80 ±0.69	21.57 ±1.25	12.07 ±0.81	3.97 ±0.45	3.40 ±0.17	1.94 ±0.73	0.89	-0.009
n-Decane		160.17 ±3.70	121.60 ±2.11	102.23 ±5.85	73.53 ±2.78	56.50 ±1.51	42.50 ±2.88	32.07 ±4.70	31.83 ±0.64	13.07 ±0.76	0.87	-0.005
1,4-Dimethyl,2-ethylbenzene		51.07 ±1.31	43.13 ±0.67	36.70 ±1.97	30.20 ±0.92	20.20 ±0.46	12.87 ±0.93	8.27 ±1.56	6.60 ±0.17	2.23 ±0.15	0.95	-0.007
n-Undecane		168.73 ±3.98	149.47 ±1.96	128.80 ±6.71	114.23 ±3.69	75.23 ±1.45	44.63 ±4.20	32.90 ±2.79	35.53 ±0.40	14.47 ±0.76	0.89	-0.006
Naphthalene		35.97 ±0.85	32.73 ±0.35	28.30 ±1.28	26.70 ±0.82	18.67 ±0.42	10.13 ±0.90	7.27 ±0.42	7.47 ±0.06	2.57 ±0.25	0.92	-0.006
n-Dodecane		164.57 ±3.45	146.73 ±11.00	118.37 ±5.08	132.43 ±3.37	82.57 ±1.46	44.00 ±3.20	34.90 ±2.01	39.67 ±0.81	14.13 ±0.70	0.89	-0.006
2-Methylnaphthalene		39.60 ±0.98	36.93 ±1.03	32.43 ±0.93	34.17 ±0.93	24.40 ±0.44	14.67 ±1.53	13.10 ±0.50	14.23 ±0.35	3.53 ±0.29	0.89	-0.005
n-Tridecane		110.93 ±1.79	104.83 ±3.21	91.13 ±2.77	97.97 ±1.21	69.80 ±2.46	42.80 ±2.86	40.87 ±1.37	46.57 ±1.27	11.77 ±1.18	0.87	-0.005
n-Tetradecane		52.97 ±0.50	49.23 ±2.20	42.97 ±0.81	50.20 ±0.62	33.70 ±0.53	24.20 ±2.17	28.00 ±0.75	30.07 ±4.13	8.27 ±0.50	0.79	-0.004

ND = non-detectable

TABLE F-15. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 7-28-82 RANGE POINT QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		27.90 ±0.75	7.43 ±0.42	ND	ND	ND	ND	ND	ND	ND	-	-
Cyclohexane		91.17 ±1.96	5.70 ±0.35	4.63 ±0.23	ND	ND	ND	ND	ND	ND	0.80	-0.324
Toluene		114.90 ±2.50	29.60 ±2.36	4.63 ±0.06	ND	ND	ND	ND	ND	ND	0.99	-0.349
Ethylbenzene		32.83 ±0.78	7.57 ±0.50	5.50 ±0.00	4.57 ±0.21	2.70 ±0.26	2.27 ±0.15	1.76 ±0.26	1.56 ±0.10	ND	0.54	-0.008
p-Xylene		31.67 ±0.74	6.77 ±0.55	5.27 ±0.06	1.70 ±0.17	0.77 ±0.04	ND	ND	ND	ND	0.74	-0.055
1-Methyl,3,ethylbenzene		44.43 ±1.07	23.93 ±1.31	15.70 ±0.10	9.77 ±0.90	1.50 ±0.05	ND	ND	ND	ND	0.97	-0.057
1,2,4-Trimethylbenzene		95.70 ±2.26	56.70 ±1.15	39.10 ±2.09	28.00 ±2.34	5.50 ±0.10	3.28 ±0.64	3.00 ±0.10	2.20 ±0.10	2.15 ±0.31	0.67	-0.009
n-Decane		197.50 ±4.05	134.57 ±6.47	96.97 ±0.97	83.73 ±6.48	29.47 ±0.97	18.07 ±0.76	16.73 ±0.31	11.43 ±1.27	ND	0.79	-0.010
1,4-Dimethyl,2-ethylbenzene		62.17 ±1.05	47.30 ±2.11	36.03 ±0.40	35.27 ±2.46	11.20 ±0.36	7.45 ±0.00	7.80 ±1.31	2.87 ±0.75	1.91 ±0.79	0.88	-0.009
n-Undecane		204.17 ±4.45	163.30 ±6.68	126.77 ±1.69	133.13 ±8.82	61.17 ±2.42	34.30 ±2.46	17.50 ±0.95	12.23 ±1.03	5.80 ±0.35	0.93	-0.009
Naphthalene		43.47 ±1.07	36.03 ±1.45	27.97 ±0.49	30.90 ±1.82	18.70 ±0.56	9.40 ±0.72	2.73 ±0.35	3.03 ±0.90	2.83 ±0.67	0.97	-0.015
n-Dodecane		198.03 ±4.62	166.83 ±5.72	115.33 ±1.85	138.63 ±7.94	114.17 ±3.50	62.60 ±5.38	28.97 ±1.76	27.90 ±2.85	21.57 ±1.40	0.87	-0.006
2-Methylnaphthalene		47.40 ±0.52	41.33 ±1.33	31.73 ±0.32	38.73 ±0.23	30.67 ±1.16	21.37 ±0.40	12.33 ±0.47	9.87 ±1.35	8.67 ±1.37	0.90	-0.005
n-Tridecane		136.23 ±1.50	114.77 ±2.15	88.70 ±0.17	110.53 ±4.22	97.87 ±1.66	76.53 ±2.70	41.17 ±2.47	44.53 ±7.96	42.17 ±2.14	0.78	-0.003
n-Tetradecane		64.70 ±1.51	55.93 ±1.10	43.17 ±1.70	55.63 ±1.27	49.90 ±0.78	45.30 ±0.36	24.73 ±2.61	29.93 ±4.66	29.60 ±3.24	0.63	-0.002

ND = non-detectable

TABLE F-16. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 7-28-82 RANGE POINT QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 4050 mg/l

	Concentration (mg/ℓ)										
Compound	0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene	19.80 ±0.44	10.20 ±0.35	2.60 ±0.00	ND	ND	ND	ND	ND	ND	0.96	-0.220
Cyclohexane	64.60 ±0.98	19.43 ±3.09	11.00 ±0.44	4.57 ±0.06	ND	ND	ND	ND	ND	0.93	-0.136
Toluene	79.57 ±1.44	89.37 ±2.64	10.97 ±0.21	3.77 ±0.40	ND	ND	ND	ND	ND	0.88	-0.185
Ethylbenzene	23.20 ±0.62	9.33 ±0.72	8.30 ±0.10	4.47 ±0.25	7.50 ±0.26	5.27 ±0.40	4.00 ±0.20	3.33 ±0.31	1.89 ±1.09	0.66	-0.005
p-Xylene	22.13 ±0.61	8.27 ±0.21	7.23 ±0.12	2.47 ±0.85	2.27 ±0.15	1.61 ±0.16	1.41 ±0.09	1.09 ±0.11	1.15 ±0.25	0.54	-0.006
1-Methyl,3-ethylbenzene	31.47 ±1.10	22.43 ±0.29	15.50 ±0.30	8.23 ±0.35	2.37 ±0.15	2.33 ±0.06	1.73 ±0.16	1.57 ±.10	1.31 ±0.15	0.64	-0.007
1,2,4-Trimethylbenzene	67.17 ±4.88	50.50 ±1.82	37.40 ±1.21	22.03 ±1.91	6.87 ±1.83	5.07 11.31	5.30 ±2.86	5.23 ±0.15	2.05 ±0.73	0.69	-0.008
n-Decane	141.00 ±5.51	121.17 ±0.87	88.03 ±1.91	60.23 ±2.00	51.20 ±1.04	35.10 ±2.19	25.63 ±0.29	21.60 ±1.40	22.20 ±2.86	0.74	-0.005
1,4-Dimethyl,2-ethylbenzene	53.00 ±1.87	42.47 ±0.21	32.50 ±0.56	25.70 ±0.80	7.77 ±0.93	5.70 ±0.70	2.57 ±0.15	3.90 ±0.20	3.80 ±2.21	0.65	-0.007
n-Undecane	150.07 ±6.98	146.70 ±1.11	116.07 ±2.35	98.70 ±2.42	56.70 ±1.40	38.33 ±2.51	30.17 ±1.36	24.60 ±1.25	25.50 ±5.32	0.77	-0.005
Naphthalene	31.83 ±1.21	32.10 ±0.36	26.07 ±0.40	23.60 ±0.46	8.57 ±0.06	6.90 ±0.30	7.73 ±0.90	11.13 ±0.21	4.60 ±0.69	0.70	-0.005
n-Dodecane	141.40 ±14.06	143.47 ±9.42	120.70 ±8.90	108.60 ±6.50	42.27 ±0.25	36.97 ±1.69	37.63 ±1.69	52.70 ±1.14	22.60 ±1.42	0.64	-0.004
2-Methylnaphthalene	35.33 ±1.37	36.20 ±1.13	30.57 ±0.47	31.00 ±0.50	14.00 ±0.30	12.83 ±0.67	12.63 ±1.94	17.27 ±0.15	4.70 ±2.60	0.69	-0.004
n-Tridecane	98.47 ±3.47	102.93 ±3.87	87.73 ±2.00	86.43 ±1.00	44.00 ±3.64	38.83 ±2.22	41.03 ±5.72	46.37 ±0.45	22.23 ±2.66	0.73	-0.003
n-Tetradecane	47.60 ±1.31	48.40 ±2.50	42.57 ±0.31	45.43 ±0.23	22.97 ±0.15	22.50 ±0.72	23.20 ±3.64	27.53 ±3.76	20.50 ±0.35	0.51	-0.002

ND = non-detectable

TABLE F-17. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 9-25-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours) 0	1	2	4	7	20	24	48.5	96	144	168	212	r^2	Slope
	Concentration (mg/ℓ)													
Benzene	27.93 ±1.05	12.47 ±2.61	8.64 ±1.08	a	8.17 ±0.15	7.87 ±0.52	7.47 ±0.26	6.21 1.93	6.63 ±0.25	7.93 ±0.84	7.31 ±0.83	7.02 ±0.46	0.18	-0.001
Cyclohexane	72.30 ±1.97	ND	ND	a	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	81.17 ±3.07	15.97*	9.29*	a	ND	ND	ND	ND	ND	ND	ND	ND	0.91	-0.471
Ethylbenzene	23.57 ±0.85	9.26 ±1.29	5.34 10.48	a	ND	ND	ND	ND	ND	ND	ND	ND	0.93	-0.286
_p_-Xylene	21.97 ±0.98	9.98 ±1.70	5.38 ±1.30	a	ND	ND	ND	ND	ND	ND	ND	ND	0.94	-0.309
1-Methyl,3-ethyl-benzene	28.37 ±3.00	22.60 ±3.58	18.17 ±0.91	a	14.25 ±0.15	ND	ND	ND	ND	ND	ND	ND	0.77	-0.038
1,2,4-Trimethyl-benzene	65.57 ±3.50	52.70 ±8.07	43.87 ±2.14	a	48.50 ±0.75	ND	ND	ND	ND	ND	ND	ND	0.22	-0.012
n-Decane	140.70 ±7.78	121.60 ±18.54	105.23 ±5.14	a	92.80 ±2.97	66.10 ±1.15	17.43 ±3.09	ND	ND	ND	ND	ND	0.67	-0.029
1,4-Dimethyl,2-ethylbenzene	47.57 ±7.71	49.27 ±9.64	48.00 ±7.84	a	31.40 ±6.25	33.53 ±5.92	16.80 ±2.60	ND	ND	ND	ND	ND	0.67	-0.15
n-Undecane	155.90 ±7.86	145.07 ±20.79	131.70 ±6.14	a	126.70 ±3.12	116.27 ±1.52	72.17 ±10.27	ND	ND	ND	ND	ND	0.72	-0.010
Naphthalene	33.80 ±1.57	31.37 ±4.05	28.77 ±1.33	a	28.17 ±0.72	27.77 ±0.25	21.40 ±2.69	ND	ND	ND	ND	ND	0.61	-0.006
n-Dodecane	151.93 ±6.27	133.10 ±21.65	132.87 ±5.13	a	120.25 ±9.75	119.30 ±0.60	101.10 ±12.31	4.75 ±1.92	10.63 ±0.92	ND	ND	ND	0.67	-0.006
2-Methylnaphthalene	38.93 ±1.22	35.00 ±3.31	34.00 ±0.92	a	32.17 ±0.14	34.37 ±0.21	31.37 ±3.51	4.29 ±0.21	9.42 ±0.21	ND	ND	ND	0.58	-0.008
n-Tridecane	105.27 ±3.44	90.97 ±7.62	95.93 ±3.38	a	85.67 ±5.28	92.43 ±3.09	58.70 ±4.17	89.50 ±11.77	6.59 ±0.34	18.27 ±0.91	35.50 ±0.95	ND	0.49	-0.004
n-Tetradecane	51.33 ±0.83	45.87 ±2.25	47.20 ±0.60	a	32.75 ±15.60	46.40 ±0.87	37.87 ±2.42	43.90 ±3.40	6.84 ±0.53	17.57 ±0.55	27.27 ±0.32	ND	0.35	-0.003

ND = non-detectable
*One injection only

[a]No sample

TABLE F-18. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 9-25-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5000 mg/ℓ

Compound	Time (Hours) 0	1	2	4	7	20	24	48.5	96	144	168	212	r^2	Slope
	Concentration (mg/ℓ)													
Benzene	24.87 ±1.02	16.27 ±1.89	12.93 ±1.89	17.33 ±2.03	16.23 ±0.85	10.02 ±0.53	10.92 ±1.50	6.57 ±0.52	5.48 ±0.48	7.90 ±0.32	6.87 ±0.71	7.20 ±0.96	0.51	-0.002
Cyclohexane	49.80 ±1.47	19.53 ±2.70	16.83 ±1.96	17.80 ±0.95	12.55 ±0.64	ND	ND	ND	ND	ND	ND	ND	0.55	-0.066
Toluene	51.77 ±2.75	33.57 ±4.03	26.63 ±3.33	19.83 ±0.72	9.89 ±1.72	ND	ND	ND	ND	ND	ND	ND	0.95	-0.096
Ethylbenzene	11.80 ±0.69	12.17 ±1.51	12.87 ±1.50	12.07 ±0.25	9.41 ±0.47	5.78 ±0.67	6.16 ±0.27	2.87 ±0.24	5.39 ±0.16	7.30 ±1.22	ND	ND	0.22	-0.002
p-Xylene	11.37 ±0.67	12.10 ±1.49	11.00 ±1.30	3.54 ±0.38	6.04 ±0.18	2.94 ±0.11	1.75 ±0.09	1.62 ±0.00	1.08 ±0.23	1.58 ±0.36	ND	ND	0.54	-0.006
1-Methyl,3-ethyl-benzene	15.40 ±0.89	21.00 ±2.79	24.27 ±2.61	12.27 ±1.32	19.93 ±0.50	13.90 ±0.52	8.20 ±0.77	4.90 ±0.18	2.60 ±0.09	ND	ND	ND	0.88	-0.006
1,2,4-Trimethyl-benzene	31.77 ±1.74	46.10 ±6.42	54.50 ±5.87	30.97 ±2.50	47.03 ±1.19	35.20 ±1.45	22.63 ±2.03	11.95 ±0.35	4.74 ±0.23	3.67 ±0.10	5.53 ±0.43	ND	0.86	-0.007
n-Decane	66.70 ±4.09	103.43 ±14.92	124.93 ±13.34	76.77 ±5.08	111.83 ±2.00	91.67 ±3.02	64.77 ±5.71	39.70 ±1.08	17.53 ±0.85	35.67 ±1.26	48.40 ±6.28	10.85 ±0.28	0.67	-0.004
1,4-Dimethyl,2-ethylbenzene	23.40 ±4.40	41.03 ±15.55	54.90 ±6.22	29.87 ±8.00	36.37 ±8.56	37.63 ±6.24	26.23 ±6.81	15.60 ±3.30	6.55 ±0.33	11.13 ±0.31	13.47 ±1.31	ND	0.57	-0.004
n-Undecane	74.60 ±3.48	119.73 ±18.55	147.20 ±15.58	103.87 ±6.09	144.93 ±3.35	138.20 18.22	111.90 ±9.01	61.10 ±1.77	20.83 ±0.90	41.97 ±1.19	58.23 ±4.71	13.07 ±0.57	0.69	-0.004
Naphthalene	16.40 ±0.72	26.10 ±3.90	32.00 ±3.32	22.27 ±1.10	32.20 ±0.82	32.07 ±2.24	27.07 ±2.06	16.60 ±0.61	4.88 ±0.23	10.67 ±0.40	13.70 ±0.89	ND	0.46	-0.003
n-Dodecane	65.10 ±2.95	102.03 ±15.20	119.23 ±13.97	94.87 ±4.75	131.43 ±2.82	135.23 ±10.23	116.07 ±8.47	75.07 ±2.14	18.97 ±0.81	45.30 ±1.65	52.83 ±2.79	10.84 ±0.55	0.67	-0.004
2-Methylnaphthalene	18.63 ±0.80	29.20 ±3.84	36.50 ±3.44	25.73 ±0.87	36.70 ±0.69	38.20 ±2.85	32.93 ±1.61	23.23 ±0.61	5.71 ±0.22	16.90 ±0.62	15.47 ±58.	3.58 ±0.00	0.49	-0.003
n-Tridecane	50.90 ±1.40	76.47 ±12.28	102.53 ±13.47	72.63 ±2.64	103.13 ±1.63	101.87 ±7.89	94.10 ±7.63	63.33 ±±.55	17.07 ±1.27	49.87 ±3.30	42.70 ±1.14	8.97 ±1.19	0.62	-0.004
n-Tetradecane	24.33 ±0.50	37.83 ±3.59	49.00 ±2.78	32.83 ±1.07	47.33 ±0.64	49.40 ±3.27	44.20 ±1.48	33.13 ±0.67	9.87 ±0.30	30.60 ±0.87	27.67 ±0.76	5.35 ±0.60	0.50	-0.003

ND = non-detectable

TABLE F-19. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 9-25-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)													
		0	1	2	4	7	20	24	48.5	96	144	168	212	r^2	Slope
Benzene		32.37 ±2.71	11.13 ±2.06	10.04 ±1.36	9.59 ±2.14	7.72 ±0.57	8.71 ±0.45	5.26 ±0.37	7.47 ±0.81	5.93 ±0.58	8.47 ±0.62	7.24 ±0.18	7.19 ±2.44	0.15	-0.001
Cyclohexane		82.53 ±6.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		92.40 ±3.59	17.30 ±2.46	11.56 ±1.06	9.78 ±1.92	ND	ND	ND	ND	ND	ND	ND	ND	0.61	-0.204
Ethylbenzene		26.80 ±1.55	9.04 ±1.25	6.47 ±1.02	6.44 ±1.28	2.33 ±0.01	ND	ND	ND	ND	ND	ND	ND	0.76	-0.121
p-Xylene		25.43 ±1.40	9.52 ±1.36	6.10 ±1.82	4.10 ±0.77	1.47 ±0.09	ND	ND	ND	ND	ND	ND	ND	0.90	-0.121
1-Methyl,3-ethylbenzene		35.67 ±1.60	19.96 ±2.64	16.83 ±2.06	17.80 ±2.84	10.63 ±0.47	ND	ND	ND	ND	ND	ND	ND	0.71	-0.058
1,2,4-Trimethylbenzene		75.57 ±3.07	46.04 ±5.80	40.17 ±4.90	43.77 ±6.67	28.87 ±1.12	4.53 ±0.04	3.88 ±0.00	ND	ND	ND	ND	ND	0.96	-0.054
n-Decane		161.13 ±6.69	106.66 ±12.86	96.13 ±11.98	105.00 ±15.08	76.30 ±2.10	18.33 ±0.81	18.73 ±0.15	26.33 ±2.00	15.93 ±1.10	ND	ND	ND	0.58	-0.010
1,4-Dimethyl,2-ethylbenzene		48.63 ±11.40	46.86 ±10.03	34.20 ±3.97	40.10 ±6.48	25.83 ±4.58	7.97 ±0.31	9.21 ±1.73	21.93 ±1.60	10.50 11.62	ND	ND	ND	0.37	-0.006
n-Undecane		177.17 ±5.84	129.88 ±15.04	120.70 ±12.95	137.87 ±15.15	105.33 ±2.77	40.97 ±1.29	36.83 ±0.57	89.57 ±6.47	52.03 ±4.05	5.22 ±0.14	8.93 ±0.45	5.41 ±0.59	0.84	-0.007
Naphthalene		37.97 ±1.27	28.46 ±3.24	26.57 ±2.71	19.70 ±1.73	22.20 ±2.62	14.20 ±2.84	11.37 ±2.02	24.83 ±1.33	15.37 ±2.84	ND	ND	ND	0.20	-0.003
n-Dodecane		170.13 ±4.98	129.56 ±11.41	115.23 ±9.74	126.20 ±9.66	95.93 ±3.85	50.83 ±1.05	46.13 ±1.12	117.43 ±10.29	82.23 ±10.55	8.58 10.52	17.63 ±0.65	11.05 ±1.42	0.77	-0.005
2-Methylnaphthalene		43.47 ±1.04	33.02 ±2.23	31.60 ±2.07	35.37 ±2.12	24.40 ±4.19	15.37 ±0.57	14.30 ±0.35	33.60 ±0.87	24.30 ±4.92	4.64 ±0.15	9.51 ±0.46	6.88 ±0.55	0.67	-0.003
n-Tridecane		114.57 ±0.92	88.26 ±3.69	89.73 ±8.97	94.00 ±8.31	69.71 ±6.29	44.13 ±0.81	41.33 ±0.81	91.43 11.94	72.37 ±7.48	18.37 ±0.45	34.47 ±1.05	27.73 ±1.79	0.59	-0.003
n-Tetradecane		57.43 ±1.46	43.98 ±1.41	42.90 ±1.20	46.10 ±0.85	33.70 ±4.08	21.03 ±0.81	20.37 ±0.65	46.27 ±0.59	38.47 ±4.52	16.47 10.55	28.03 ±0.40	24.43 ±0.76	0.28	-0.001

ND = non-detectable

TABLE F-20. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 9-25-82 ESCAMBIA RIVER QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5000 mg/ℓ

Compound	Time (Hours) 0	1	2	4	7	20	24	48.5	96	144	168	212	r^2	Slope
	Concentration (mg/ℓ)													
Benzene	29.97 ±1.68	12.57 ±1.69	6.30 ±0.00	11.08 ±2.29	16.87 ±0.42	24.40 ±1.59	12.60 ±0.35	6.53 ±0.84	6.17 ±1.69	5.00 ±0.52	5.59 ±0.69	6.45 ±0.58	0.46	-0.002
Cyclohexane	74.67 ±4.46	20.70 ±2.26	21.70 ±0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.74	-26.490
Toluene	82.47 ±3.30	34.50 ±3.84	15.87 ±1.21	10.63 ±1.94	9.83 ±0.86	ND	ND	ND	ND	ND	ND	ND	0.72	-0.118
Ethylbenzene	23.23 ±0.91	13.20 ±1.25	6.63 ±0.66	6.93 ±1.46	11.53 ±0.35	7.89 ±0.49	5.74 ±0.22	5.12 ±0.64	3.34 ±0.63	4.52 ±0.78	5.90 ±0.95	2.51 ±0.19	0.52	-0.003
p-Xylene	22.07 ±0.90	12.83 ±1.17	3.28 ±0.25	4.39 ±0.93	5.27 ±0.20	4.06 ±0.00	1.52 ±0.02	1.06 ±0.05	0.93 ±0.06	1.44 ±0.13	ND	ND	0.45	-0.007
1-Methyl,3-ethylbenzene	31.33 ±1.00	22.20 ±1.73	9.47 ±0.36	18.60 ±3.11	17.13 ±±.05	9.09 ±0.61	7.87 ±0.27	3.49 ±0.30	3.71 ±0.68	ND	ND	ND	0.68	-0.009
1,2,4-Trimethylbenzene	66.27 ±1.65	49.00 ±3.50	21.20 ±1.28	45.53 ±5.22	39.47 ±2.26	23.93 ±0.61	22.07 ±0.81	8.29 ±0.67	4.77 ±0.84	3.43 ±0.13	5.94 ±0.42	ND	0.77	-0.007
n-Decane	142.60 ±2.45	111.50 ±7.87	48.03 ±3.59	109.97 ±13.94	91.13 ±2.91	62.53 ±2.85	62.30 ±2.01	32.53 ±2.37	23.87 ±4.20	37.03 ±5.41	46.33 ±7.90	20.60 ±0.79	0.56	-0.003
1,4-Dimethyl,2-ethylbenzene	54.40 ±0.10	39.67 ±11.16	20.23 ±4.65	45.75 ±17.04	33.63 ±7.67	29.37 ±5.87	35.07 ±6.07	12.40 ±0.87	7.88 ±1.84	8.91 ±±.39	11.93 ±2.58	4.49 ±0.69	0.74	-0.004
n-Undecane	158.67 ±±.76	133.53 ±7.43	61.87 ±3.00	143.37 ±12.32	117.83 ±2.84	97.57 ±4.67	108.13 ±2.27	38.70 ±2.17	28.23 ±5.28	45.67 ±7.35	54.23 ±8.06	24.52 ±0.99	0.61	-0.003
Naphthalene	34.23 ±0.75	29.37 ±1.46	12.80 ±1.78	32.60 ±3.66	25.93 ±0.93	25.67 ±2.72	26.50 ±0.26	9.25 ±0.39	6.25 ±1.17	10.23 ±1.72	11.78 ±1.67	5.09 ±0.59	0.62	-0.003
n-Dodecane	152.67 ±4.48	130.10 ±2.20	56.13 ±4.76	130.87 ±7.66	106.63 ±1.84	97.90 ±4.87	112.50 ±1.01	41.62 ±1.36	26.73 ±4.74	44.20 ±6.99	50.10 ±6.46	20.50 ±0.96	0.64	-0.003
2-Methylnaphthalene	38.40 ±1.37	34.17 ±1.33	14.87 ±2.66	34.07 ±5.30	29.63 ±0.91	27.63 ±2.89	32.87 ±0.15	13.27 ±0.32	8.21 ±2.24	15.07 ±2.04	16.27 ±1.83	6.30 ±0.32	0.57	-0.003
n-Tridecane	102.93 ±1.11	94.20 ±3.65	45.90 ±7.25	93.50 ±3.99	83.67 ±1.45	78.13 ±5.23	92.43 ±4.10	39.80 ±0.56	27.17 ±5.57	46.43 ±5.78	48.57 ±5.01	19.77 ±1.31	0.58	-0.002
n-Tetradecane	49.73 ±1.17	45.07 ±0.93	20.03 ±3.49	45.50 ±3.22	38.40 ±0.62	34.83 ±3.67	43.40 ±0.17	19.83 ±0.15	14.93 ±2.30	28.83 ±2.41	31.33 ±2.37	12.77 ±1.27	0.36	-0.002

ND = non-detectable

TABLE F-21. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 10-15-82 BAYOU CHICO SHAKEN FATE SCREEN, JP-4

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	2	4.5	8	26.5	48	75	120	168	r^2	Slope
Benzene		1.46 ±0.08	0.83 ±0.15	0.84 ±0.12	0.44 ±0.12	0.07 ±0	0.03 ±0.01	0.04 ±0.04	0.06 ±0.07	ND	0.60	-0.014
Toluene		2.11 ±0.17	1.36 ±0.16	1.25 ±0.16	0.69 ±0.04	ND	ND	ND	ND	ND	0.91	-0.056
p-Xylene		0.15 ±0.01	0.10 ±0.01	0.06 ±0.01	ND	ND	ND	ND	ND	ND	0.95	-0.088

ND = non-detectable

TABLE F-22. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 10-15-82 BAYOU CHICO SHAKEN FATE SCREEN, JP-4

		Concentration (mg/ℓ)										
Compound	Time (Hours)	0	2	4.5	8	26.5	48	75	120	168	r^2	Slope
Benzene		1.40 ±0.08	0.81 ±0.05	0.78 ±0.14	0.13 ±0.07	0.19 ±0.03	0.04 ±0.02	0.09 ±0.03	0.14 ±0.02	0.13 ±0.01	0.26	-0.005
Toluene		2.11 ±0.13	1.27 ±0.04	1.13 ±0.14	ND	ND	ND	ND	ND	ND	0.81	-0.059
p-Xylene		0.16 ±0.01	0.09 ±0.01	0.06 ±0.00	ND	ND	ND	ND	ND	ND	0.96	-0.094

ND = non-detectable

TABLE F-23. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 10-15-82 BAYOU CHICO SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4.5	8	26.5	48	75	120	168	r^2	Slope
Benzene		1.38 ±0.24	0.77 ±0.07	0.71 ±0.10	0.42 ±0.13	0.12 ±0.04	0.03 ±0.02	0.01 ±0.00	0.14 ±0.04	ND	0.46	-0.012
Toluene		2.08 ±0.25	1.10 ±0.01	1.21 ±0.08	0.65 ±0.10	ND	ND	ND	ND	ND	0.81	-0.056
p-Xylene		0.15 ±0.01	0.09 ±0.01	0.06 ±0.00	ND	ND	ND	ND	ND	ND	0.91	-0.085

ND = non-detectable

TABLE F-24. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 10-15-82 BAYOU CHICO SHAKEN FATE SCREEN, JP-4

Compound	Time (Hours)	Concentration (mg/ℓ)										
		0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		1.71 ±0.25	0.87 ±0.09	0.95 ±0.24	0.61 ±0.12	0.09 ±0.05	0.11 ±0.04	0.07 ±0.03	0.16 ±0.02	ND	0.45	-0.009
Toluene		2.50 ±0.21	1.37 ±0.07	1.51 ±0.14	0.87 ±0.11	ND	ND	ND	ND	ND	0.80	-0.050
p-Xylene		0.18 ±0.02	0.10 ±0.00	0.08 ±0.00	0.06 ±0.01	ND	ND	ND	ND	ND	0.88	-0.056

ND = non-detectable

TABLE F-25. HYDROCARBON CONCENTRATIONS IN ACTIVE WATER FLASK, 10-15-82 BAYOU CHICO QUIESCENT FATE SCREEN, JP-4

Compound	Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
		Concentration (mg/ℓ)										
Benzene		23.80 ±2.35	10.81 ±1.41	8.32 ±1.92	8.09 ±0.48	6.66 ±0.63	6.43 ±0.59	6.74 ±0.79	6.09 ±0.10	6.88 ±0.36	0.26	-.002
Cyclohexane		55.53 ±5.31	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		62.87 ±3.70	9.14 ±0.92	ND	ND	ND	ND	ND	ND	ND	1.0	-.419
Ethylbenzene		17.57 ±0.75	5.36 ±0.57	4.08 ±0.69	2.09 ±0.12	ND	ND	ND	ND	ND	0.86	-.106
p-Xylene		16.70 ±0.66	4.07 ±0.38	3.05 ±0.48	1.57 ±0.09	ND	ND	ND	ND	ND	0.83	-.116
1-Methyl,3-ethylbenzene		24.07 ±0.72	15.67 ±1.37	18.40 ±2.93	13.40 ±0.56	ND	ND	ND	ND	ND	0.61	-.026
1,2,4 Trimethylbenzene		50.27 ±1.59	37.27 ±3.18	42.03 ±6.74	33.20 ±1.35	4.07 ±0.30	ND	ND	ND	ND	0.95	-.046
n-Decane		107.37 ±3.15	90.23 ±7.75	105.83 ±16.53	90.60 ±3.30	18.20 ±1.13	13.87 ±0.55	ND	ND	ND	0.85	-.014
1,4-Dimethyl,2-ethylbenzene		35.63 ±6.35	36.10 ±4.24	39.17 ±5.43	45.07 ±7.64	11.20 ±1.15	8.53 14.68	ND	ND	ND	0.79	-.015
n-Undecane		117.73 ±2.57	110.70 ±10.33	138.83 ±20.71	129.03 ±3.99	48.40 ±2.56	60.03 ±2.54	34.27 ±4.86	11.40 ±0.35	ND	0.92	-.008
Naphthalene		25.50 10.44	23.43 ±2.74	30.90 ±4.33	29.47 ±0.87	12.27 ±1.66	21.37 ±2.85	15.00 ±2.27	8.25 ±0.34	ND	0.67	-.004
n-Dodecane		110.37 15.60	95.50 ±15.24	135.53 ±17.23	124.17 ±4.72	52.77 ±2.21	83.67 ±2.61	75.43 ±15.30	54.20 ±1.22	ND	0.47	-.003
2-Methylnaphthalene		29.00 ±0.50	25.17 ±5.01	35.63 ±3.58	34.77 ±0.61	16.67 ±2.72	27.27 ±1.07	25.13 ±3.79	23.17 ±0.74	ND	0.10	-.001
n-Tridecane		77.93 ±1.12	71.03 ±9.14	95.00 ±9.11	96.47 ±5.61	50.20 ±5.57	81.57 ±5.50	72.50 ±9.26	73.07 ±1.46	ND	0.30	-.000
n-Tetradecane		41.13 ±1.12	39.10 ±5.25	47.33 ±2.11	47.57 ±0.95	24.60 ±2.52	40.43 ±0.57	40.73 ±5.25	43.20 ±0.44	6.20 ±0.14	0.45	-.003

ND = non-detectable

TABLE F-26. HYDROCARBON CONCENTRATIONS IN ACTIVE SEDIMENT FLASK, 10-15-82 BAYOU CHICO QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5029 mg/ℓ

Compound	Time (Hours)	0	2	4	8	24	48	72	120	168	r^2	Slope
		Concentration (mg/ℓ)										
Benzene		23.17 ±3.48	11.43 ±1.33	10.60 10.36	7.04 ±0.28	5.94 ±1.08	8.62 ±2.82	7.06 ±0.50	6.78 ±0.21	5.60 ±0.27	0.31	-.002
Cyclohexane		60.30 ±8.55	24.00 ±2.76	22.33 ±0.32	13.37 ±0.38	9.11 ±2.03	ND	ND	ND	ND	0.68	-.027
Toluene		70.60 ±5.55	28.57 ±3.31	21.07 ±0.90	11.27 ±0.83	4.65 ±0.57	ND	ND	ND	ND	0.83	-.042
Ethylbenzene		20.07 ±1.93	11.30 1.23	11.20 ±0.20	8.12 ±0.26	8.72 ±0.89	6.45 ±0.83	9.08 ±0.33	7.03 ±0.13	5.35 ±0.35	0.50	-.006
p-Xylene		18.97 ±1.76	10.45 ±1.10	7.70 ±1.61	3.95 ±0.15	2.39 ±0.23	1.55 ±0.23	2.13 ±0.06	1.58 ±0.03	1.18 ±0.08	0.59	-.006
1-Methyl,3-ethylbenzene		27.77 ±2.39	17.97 ±1.77	18.37 ±0.65	12.67 ±0.49	11.40 ±0.85	3.82 ±0.58	5.37 ±0.65	2.86 ±0.40	4.69 ±0.33	0.63	-.005
1,2,4 Trimethylbenzene		58.67 ±4.95	39.50 ±3.99	36.30 ±1.35	25.13 ±0.91	22.67 ±1.66	9.69 ±1.38	9.38 ±3.50	6.36 ±0.07	3.73 ±0.25	0.85	-.007
n-Decane		125.63 ±10.25	91.77 ±9.05	82.77 ±3.51	58.27 ±1.74	57.50 ±4.03	41.35 ±6.43	56.23 ±1.89	42.40 ±0.95	32.97 ±1.50	0.63	-.003
1,4-Dimethyl,2-ethylbenzene		47.20 ±3.39	32.07 ±2.97	22.50 ±1.25	29.93 ±0.60	19.03 ±3.31	16.03 ±3.91	19.60 ±0.53	17.00 ±0.17	7.55 ±1.86	0.69	-.003
n-Undecane		141.00 ±8.99	111.03 ±9.84	99.13 ±5.74	74.60 ±1.31	74.60 ±3.50	49.50 ±7.23	65.23 ±2.17	49.17 ±0.68	38.97 ±0.90	0.70	-.003
Naphthalene		30.83 ±±.50	24.50 ±1.99	22.07 ±1.46	17.30 ±0.17	17.00 ±0.50	13.25 ±1.75	16.60 ±0.52	12.27 ±0.23	9.44 ±0.18	0.74	-.002
n-Dodecane		138.57 ±5.19	104.87 ±11.73	86.67 ±5.23	72.40 ±3.41	71.10 ±2.93	51.95 ±7.54	64.67 ±2.15	44.63 ±0.76	34.03 ±0.15	0.76	-.003
2-Methylnaphthalene		35.60 ±0.62	28.13 ±1.88	25.33 ±1.27	21.03 ±0.21	22.67 ±0.25	19.78 ±2.48	20.93 ±0.75	13.50 ±0.00	10.33 10.06	0.85	-.003
n-Tridecane		95.47 ±1.42	75.83 ±5.00	67.37 ±3.59	56.90 ±0.75	66.33 ±2.90	52.73 ±4.95	61.37 ±1.00	37.63 ±1.59	27.23 ±1.07	0.84	-.003
n-Tetradecane		50.50 ±0.20	38.77 ±1.69	34.13 ±1.46	29.50 ±0.63	31.57 ±0.15	29.80 ±2.02	34.63 ±0.57	21.47 ±0.35	15.17 ±0.15	0.77	-.002

ND = non-detectable

TABLE F-27. HYDROCARBON CONCENTRATIONS IN STERILE WATER FLASK, 10-15-82 BAYOU CHICO QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5029 mg/ℓ

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		28.03 ±2.42	8.90[b] ±0.52	6.78 ±0.19	7.07 ±1.22	6.17[b] ±1.04	6.98 ±0.50	7.77 ±0.10	7.45 ±0.45	5.96 ±0.55	0.21	-0.002
Cyclohexane		74.93 ±6.25	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene		88.93 ±8.50	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Ethylbenzene		26.73 ±2.83	1.49[b] ±0.17	3.34 ±0.47	3.61 ±0.12	2.97[b]	ND	ND	ND	ND	0.72	-0.109
p-Xylene		25.30 ±2.86	1.26[b] ±0.34	2.49 ±0.14	2.08 10.30	ND	ND	ND	ND	ND	0.80	-0.136
1-Methyl,3-ethylbenzene		37.00 ±4.56	4.25[b] ±0.20	13.67 ±0.59	13.43 ±1.88	ND	ND	ND	ND	ND	0.74	-0.055
1,2,4-Trimethylbenzene		78.83 ±10.03	11.20[b] ±0.50	31.30 ±1.23	32.63 ±3.81	ND	ND	ND	ND	ND	0.69	-0.048
n-Decane		167.47 ±21.15	29.20[b] ±1.57	79.23 ±2.74	86.73 ±9.66	18.13[b] ±0.21	6.64 ±0.35	ND	ND	ND	0.97	-0.025
1,4-Dimethyl-2-ethyl-benzene		56.87 ±16.88	16.57[b] ±0.60	23.33 ±0.55	46.20 ±5.54	5.18[b] ±0.00	5.31 ±0.23	8.48 ±0.18	ND	ND	0.76	-0.012
n-Undecane		187.13 ±24.20	42.93[b] ±1.43	106.43 ±2.38	125.60 ±9.08	5.06[b] ±0.51	34.33 ±4.02	39.30 ±0.98	8.17 10.35	ND	0.95	-0.010
Naphthalene		40.27 ±4.78	9.94[b] ±0.31	24.13 ±0.40	28.67 ±2.70	16.40[b] ±1.75	13.53 ±0.31	ND	ND	ND	0.83	-0.005
n-Dodecane		179.77 ±20.77	38.80[b] ±1.23	106.83 ±1.69	121.43 ±10.86	12.53[b] ±1.19	63.10 ±5.81	71.47 ±1.97	20.93 ±0.65	ND	0.83	-0.005
2-Methylnaphthalene		45.37 ±4.94	12.13[b] ±0.40	28.73 ±0.59	34.10 ±2.69	4.81[b] ±1.06	24.70 ±1.76	24.73 ±0.38	12.47 ±0.38	ND	0.84	-0.004
n-Tridecane		127.27 ±22.32	32.80[b] ±0.92	78.77 ±2.70	92.17 ±7.30	16.13[b] ±1.60	65.50 ±6.42	70.30 ±3.70	44.93 ±1.65	ND	0.76	-0.003
n-Tetradecane		62.50 ±4.33	16.63[b] ±0.42	39.80 ±0.75	45.93 ±4.26	8.58[b] ±1.20	35.23 ±1.91	39.37 ±0.35	31.53 ±1.45	6.04 ±0.82	0.72	-0.004

ND = non-detectable
[b] - Values unusually low and not used in regression analysis.

TABLE F-28. HYDROCARBON CONCENTRATIONS IN STERILE SEDIMENT FLASK, 10-15-82 BAYOU CHICO QUIESCENT FATE SCREEN, JP-4

Sediment Concentration: 5029 mg/ℓ

Compound	Time (Hours)	Concentration (mg/ℓ) 0	2	4	8	24	48	72	120	168	r^2	Slope
Benzene		27.70 ±4.30	11.36 ±1.64	9.89 ±1.13	7.35 ±1.70	4.95 ±0.32	8.99 ±0.[illegible]9	6.67 ±0.99	6.16 ±0.70	6.04 ±0.22	0.26	-.002
Cyclohexane		71.03 ±10.61	16.63 ±2.20	20.00 ±2.10	14.37 ±3.93	6.01 ±0.32	ND	ND	ND	ND	0.67	-.033
Toluene		84.70 ±10.32	21.77 ±2.16	20.50 ±0.53	11.35 ±2.19	ND	ND	ND	ND	ND	0.77	-.096
Ethylbenzene		24.33 ±2.90	7.96 ±0.68	10.83 ±0.59	9.47 ±1.68	6.62 ±0.32	9.79 ±1.11	8.98 ±0.76	7.87 ±0.99	7.01 ±0.38	0.20	-.001
p-Xylene		23.00 ±2.69	7.31 ±0.59	8.50 ±1.97	4.45 10.83	1.85 ±0.10	2.52 ±0.29	2.19 ±0.19	1.78 ±0.22	1.57 ±0.08	0.52	-.005
1-Methyl,3-ethylbenzene		33.47 ±3.62	11.83 ±0.91	18.37 ±0.99	15.17 ±2.28	8.48 ±0.34	8.96 ±0.81	10.19 ±0.62	4.05 ±0.62	ND	0.67	-.005
1,2,4-Trimethylbenzene		71.43 ±7.87	25.77 ±2.01	36.53 ±2.01	30.53 ±4.13	17.20 ±0.78	20.03 ±2.22	5.79 ±0.84	5.65 ±0.77	4.63 ±0.93	0.79	-.006
n-Decane		151.87 ±15.85	59.47 ±4.72	83.93 ±4.87	71.50 ±9.01	43.90 ±2.43	63.40 ±6.51	54.53 ±1.88	50.93 ±6.48	44.13 ±1.12	0.34	-.002
1,4-Dimethyl,2-ethylbenzene		44.70 ±4.89	23.97 ±7.23	26.77 ±4.68	29.17 ±5.26	14.57 ±3.75	20.83 ±2.65	19.23 ±0.71	21.27 ±3.14	10.72 ±2.13	0.43	-.002
n-Undecane		117.73 ±2.57	110.70 ±10.33	138.83 ±20.71	129.03 ±3.99	48.40 ±2.56	60.03 ±1.11	60.6 ±7.32	11.40 ±0.35	ND	0.92	-.008
Naphthalene		36.07 ±2.84	16.23 ±1.21	23.10 ±1.18	21.10 ±1.65	13.90 ±0.36	16.80 ±1.71	14.60 ±0.20	13.47 ±3.11	15.37 ±0.32	0.30	-.001
n-Dodecane		160.70 ±11.48	62.17 ±4.91	98.00 ±7.71	91.13 ±5.71	54.97 ±1.36	70.20 ±6.75	60.73 ±0.35	58.20 ±9.53	5.86 ±0.006	0.67	-.006
2-Methylnaphthalene		40.50 ±2.26	19.20 ±1.31	27.03 ±0.85	25.47 ±1.16	13.70 ±0.36	25.10 ±1.65	19.10 ±0.26	17.37 ±4.37	15.13 ±0.51	0.44	-.002
n-Tridecane		111.13 ±9.35	51.67 ±4.02	72.10 ±1.92	68.37 ±2.04	52.17 ±0.61	67.33 ±6.37	54.93 ±1.21	55.70 ±12.25	43.33 ±1.38	0.35	-.001
n-Tetradecane		56.63 ±2.04	26.07 ±1.77	36.77 ±0.57	35.37 ±0.35	26.83 ±0.35	35.37 ±1.08	32.13 ±0.64	31.40 ±5.33	25.30 ±0.87	0.20	-.001

ND = non-detectable

APPENDIX G

MICROBIAL NUMBERS

5-4-82 to 10-15-82

Table G-1. MICROBIAL NUMBERS (MPN/ml) 5-4-82 ESCAMBIA RIVER FATE SCREEN, MODEL FUEL.

SHAKEN TEST

	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
FLASK	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	4.5×10^2	5.0×10^3	$>1.8 \times 10^5$	3.0×10^5	2.75×10^4	5.0×10^5	--	--
ACTIVE SEDIMENT[a]	1.1×10^3	2.0×10^3	$>1.8 \times 10^5$	4.5×10^5	$>1.8 \times 10^5$	3.5×10^6	--	--
CONTROL WATER	1.3×10^3	6.0×10^4	8.0×10^3	2.5×10^4	9.0×10^4	1.1×10^6	--	--
CONTROL SEDIMENT[a]	2.75×10^3	1.7×10^4	7.0×10^3	1.1×10^5	2.5×10^4	1.2×10^5	--	--

QUIESCENT TEST

	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
FLASK	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--[b]	--	--	--	--	--	--	--
ACTIVE SEDIMENT	--	--	--	--	--	--	--	--
CONTROL WATER	--	--	--	--	--	--	--	--
CONTROL SEDIMENT	--	--	--	--	--	--	--	--

[a]Sediment flasks contained 494 mg/ℓ (dry weight) organic sediment.

[b]No quiescent test this date.

Table G-2. MICROBIAL NUMBERS (MPN/ml) 5-18-82 ESCAMBIA RIVER FATE SCREEN, MODEL FUEL.

SHAKEN TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	2.5×10^{2}	7.0×10^{3}	5.5×10^{4}	3.5×10^{5}	$>1.8 \times 10^{5}$	1.1×10^{6}	--	--
ACTIVE SEDIMENT[a]	3.5×10^{2}	2.5×10^{4}	$>1.8 \times 10^{5}$	8.0×10^{5}	$>1.8 \times 10^{5}$	1.1×10^{6}	--	--
CONTROL WATER	8.0×10^{3}	5.0×10^{5}	5.5×10^{4}	8.0×10^{5}	3.5×10^{4}	7.0×10^{4}	--	--
CONTROL SEDIMENT[a]	1.1×10^{4}	1.7×10^{5}	2.25×10^{4}	1.3×10^{6}	3.5×10^{4}	2.5×10^{5}	--	--

QUIESCENT TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	1.7×10^{4}	1.7×10^{4}	3.5×10^{3}	1.1×10^{4}	$>1.8 \times 10^{5}$	2.5×10^{5}	--	--
ACTIVE SEDIMENT[b]	4.0×10^{3}	8.0×10^{4}	1.1×10^{4}	2.5×10^{4}	1.6×10^{5}	3.5×10^{5}	--	--
CONTROL WATER	1.7×10^{4}	1.7×10^{5}	1.1×10^{4}	5.0×10^{5}	5.5×10^{4}	3.5×10^{5}	--	--
CONTROL SEDIMENT[b]	2.25×10^{4}	3.0×10^{5}	5.5×10^{4}	2.5×10^{5}	2.5×10^{4}	2.5×10^{5}	--	--

[a] Shaken sediment flasks contained 506 mg/ℓ (dry weight) organic sediment.
[b] Quiescent sediment bottles contained 562 mg/ℓ (dry weight) sediment.

Table G-3. MICROBIAL NUMBERS (MPN/ml) 6-8-82 BAYOU CHICO FATE SCREEN, MODEL FUEL.

SHAKEN TEST

	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
FLASK	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	4.0×10^3	9.0×10^4	7.0×10^5	3.5×10^4	2.5×10^6	--	--
ACTIVE SEDIMENT[a]	--	2.75×10^5	$>1.8 \times 10^5$	5.5×10^6	$>1.8 \times 10^5$	5.5×10^6	--	--
CONTROL WATER	--	$<2.0 \times 10^3$	2.5×10^2	1.1×10^6	3.5×10^3	1.1×10^5	--	--
CONTROL SEDIMENT[a]	--	$<2.0 \times 10^3$	2.25×10^3	3.5×10^6	3.5×10^3	1.3×10^6	--	--

QUIESCENT TEST

	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
FLASK	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	1.1×10^4	2.75×10^3	7.0×10^3	2.75×10^4	8.0×10^5	--	--
ACTIVE SEDIMENT[b]	--	2.5×10^5	9.0×10^4	1.1×10^6	1.6×10^5	9.0×10^6	--	--
CONTROL WATER	--	4.5×10^5	2.75×10^3	5.0×10^5	4.0×10^2	2.5×10^5	--	--
CONTROL SEDIMENT[b]	--	7.0×10^5	1.3×10^4	3.5×10^6	1.4×10^4	3.5×10^6	--	--

[a] Shaken sediment flasks contained 515 mg/ℓ (dry weight) organic sediment.
[b] Quiescent sediment bottles contained 589 mg/ℓ (dry weight) organic sediment.

Table G-4. MICROBIAL NUMBERS (MPN/ml) 6-30-82 ESCAMBIA RIVER FATE SCREEN, JP-4.

SHAKEN TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	8.0×10^2	3.5×10^5	--	--	2.75×10^5	8.0×10^5	5.0×10^4	2.25×10^5
ACTIVE SEDIMENT[a]	4.0×10^3	2.5×10^5	--	--	9.0×10^5	8.0×10^5	2.25×10^5	8.0×10^5
CONTROL WATER	1.1×10^4	3.5×10^5	--	--	1.1×10^5	1.7×10^5	1.7×10^5	1.3×10^5
CONTROL SEDIMENT[a]	1.7×10^4	8.0×10^4	--	--	1.7×10^5	2.5×10^5	3.5×10^4	7.0×10^5

QUIESCENT TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	1.0×10^4	4.0×10^4	--	--	9.5×10^5	5.0×10^5	7.0×10^5	7.0×10^5
ACTIVE SEDIMENT[b]	6.0×10^3	5.0×10^4	--	--	9.0×10^6	3.5×10^7	9.0×10^6	5.0×10^6
CONTROL WATER	1.1×10^4	8.0×10^4	--	--	1.4×10^5	5.0×10^5	2.0×10^5	3.5×10^5
CONTROL SEDIMENT[b]	2.0×10^4	1.3×10^6	--	--	2.5×10^4	4.5×10^5	4.5×10^5	1.7×10^6

[a] Sediment flasks contained 515 mg/ℓ (dry weight) organic sediment.
[b] Quiescent sediment bottles contained 5152 mg/ℓ (dry weight) organic sediment.

Table G-5. MICROBIAL NUMBERS (MPN/ml) 7-28-82 RANGE POINT FATE SCREEN, JP-4.

SHAKEN TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	2.0×10^2	2.25×10^5	--	--	1.3×10^3	5.0×10^5	1.3×10^3	7.0×10^3
ACTIVE SEDIMENT[a]	5.0×10^2	3.5×10^5	--	--	1.7×10^3	4.5×10^4	1.1×10^3	7.0×10^3
CONTROL WATER	1.3×10^3	3.5×10^5	--	--	1.7×10^3	3.5×10^5	1.7×10^3	2.5×10^5
CONTROL SEDIMENT[a]	8.0×10^2	1.3×10^5	--	--	4.5×10^3	2.25×10^5	1.7×10^3	2.5×10^4

QUIESCENT TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	$<2 \times 10^3$	2.0×10^4	--	--	1.3×10^5	1.4×10^5	8.0×10^3	8.0×10^4
ACTIVE SEDIMENT[b]	2.0×10^3	3.0×10^5	--	--	1.7×10^5	3.5×10^7	1.3×10^6	2.5×10^7
CONTROL WATER	$<2 \times 10^3$	5.0×10^4	--	--	5.0×10^3	4.5×10^5	1.4×10^4	2.0×10^4
CONTROL SEDIMENT[b]	$<2 \times 10^3$	2.0×10^6	--	--	$<2 \times 10^3$	8.0×10^5	$<2 \times 10^3$	2.0×10^4

[a]Shaken sediment flasks contained 486 mg/ℓ (dry weight) organic sediment.
[b]Quiescent sediment bottles contained 4050 mg/ℓ (dry weight) organic sediment.

Table G-6. MICROBIAL NUMBERS (MPN/ml) 8-10-82 BAYOU CHICO FATE SCREEN, MODEL FUEL.

SHAKEN TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	5.0×10^4	--	--	--	5.0×10^5	--	1.3×10^5
ACTIVE SEDIMENT[a]	--	1.4×10^5	--	--	--	5.0×10^5	--	3.5×10^5
CONTROL WATER	--	3.5×10^4	--	--	--	1.4×10^4	--	5.0×10^4
CONTROL SEDIMENT[a]	--	1.1×10^5	--	--	--	4.5×10^5	--	2.25×10^5

QUIESCENT TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	2.0×10^4	--	--	--	5.0×10^5	--	1.7×10^5
ACTIVE SEDIMENT[b]		2.0×10^4	--	--	--	9.0×10^7	--	1.3×10^7
CONTROL WATER	--	5.0×10^4	--	--	--	5.0×10^4	--	4.0×10^4
CONTROL SEDIMENT[b]		9.5×10^5	--	--	--	4.5×10^5	--	5.0×10^6

[a] Shaken sediment flasks contained 493 mg/ℓ (dry weight) organic sediment.
[b] Quiescent sediment bottles contained 2930 mg/ℓ (dry weight) organic sediment.

Table G-7. MICROBIAL NUMBERS (MPN/ml) 8-18-82 ESCAMBIA RIVER FATE SCREEN, MODEL FUEL.

SHAKEN TEST

FLASK	3-6 hrs. hydrocarbon-oclastic	3-6 hrs. heterotrophic	24 hrs. hydrocarbon-oclastic	24 hrs. heterotrophic	48 hrs. hydrocarbon-oclastic	48 hrs. heterotrophic	168 hrs. hydrocarbon-oclastic	168 hrs. heterotrophic
ACTIVE WATER	--[a]	--	--	--	--	--	--	--
ACTIVE SEDIMENT	--	--	--	--	--	--	--	--
CONTROL WATER	--	--	--	--	--	--	--	--
CONTROL SEDIMENT	--	--	--	--	--	--	--	--

QUIESCENT TEST

FLASK	3-6 hrs. hydrocarbon-oclastic	3-6 hrs. heterotrophic	24 hrs. hydrocarbon-oclastic	24 hrs. heterotrophic	48 hrs. hydrocarbon-oclastic	48 hrs. heterotrophic	168 hrs. hydrocarbon-oclastic	168 hrs. heterotrophic
ACTIVE WATER	2.0×10^{3}	$<2.0 \times 10^{4}$	--	--	4.5×10^{4}	8.0×10^{5}	--	2.5×10^{6}
ACTIVE SEDIMENT[b]	5.0×10^{3}	2.0×10^{4}	--	--	3.5×10^{5}	3.5×10^{6}	--	3.5×10^{7}
CONTROL WATER	5.0×10^{3}	$<2.0 \times 10^{4}$	--	--	1.7×10^{4}	4.5×10^{5}	--	1.3×10^{5}
CONTROL SEDIMENT[b]	5.0×10^{4}	1.1×10^{6}	--	--	2.25×10^{5}	[illegible] $\times 10^{6}$	--	1.[illegible] $\times 10^{7}$

[a] No shaken test this date.
[b] Quiescent sediment bottles contained 4751 mg/ℓ (dry weight) organic sediment.

Table G-8. MICROBIAL NUMBERS (MPN/ml) 9-25-82 ESCAMBIA RIVER FATE SCREEN, JP-4.

SHAKEN TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	--	--	--	--	--	--	--
ACTIVE SEDIMENT	--	--	--	--	--	--	--	--
CONTROL WATER	--	--	--	--	--	--	--	--
CONTROL SEDIMENT	--	--	--	--	--	--	--	--

QUIESCENT TEST

FLASK	3-6 hrs.		24 hrs.		48 hrs.		168 hrs.	
	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic	hydrocarbon-oclastic	heterotrophic
ACTIVE WATER	--	1.1×10^5	--	--	--	8.0×10^5	--	2.6×10^6
ACTIVE SEDIMENT[b]		1.3×10^6	--	--	--	8.0×10^6	--	9.0×10^7
CONTROL WATER	-	3.5×10^5	--	--	--	5.0×10^5	--	4.5×10^6
CONTROL SEDIMENT[b]	--	5.0×10^6	--	--	--	3.5×10^6	--	8.0×10^6

[a] No shaken test this date.
[b] Quiescent sediment bottles contained 5000 mg/ℓ (dry weight) organic sediment.

Table G-9. MICROBIAL NUMBERS (MPN/ml) 10-15-82 BAYOU CHICO FATE SCREEN, JP-4.

SHAKEN TEST

FLASK	3-6 hrs. hydrocarbon-oclastic	3-6 hrs. heterotrophic	24 hrs. hydrocarbon-oclastic	24 hrs. heterotrophic	48 hrs. hydrocarbon-oclastic	48 hrs. heterotrophic	168 hrs. hydrocarbon-oclastic	168 hrs. heterotrophic
ACTIVE WATER	1.3×10^3	5.0×10^3	--	--	1.3×10^3	2×10^3	1.3×10^3	1.3×10^4
ACTIVE SEDIMENT[a]	2.5×10^3	2.5×10^4	--	--	1.3×10^3	4.5×10^4	1.3×10^3	5.0×10^4
CONTROL WATER	1.1×10^3	5.0×10^3	--	--	5.0×10^2	1.3×10^4	1.1×10^3	5.0×10^3
CONTROL SEDIMENT[a]	1.7×10^3	3.5×10^4	--	--	7.0×10^4	3.5×10^2	4.0×10^2	9.0×10^3

QUIESCENT TEST

FLASK	3-6 hrs. hydrocarbon-oclastic	3-6 hrs. heterotrophic	24 hrs. hydrocarbon-oclastic	24 hrs. heterotrophic	48 hrs. hydrocarbon-oclastic	48 hrs. heterotrophic	168 hrs. hydrocarbon-oclastic	168 hrs. heterotrophic
ACTIVE WATER	[illegible]	[illegible]		--	5.0×10^3	1.7×10^5	1.7×10^5	1.7×10^4
ACTIVE SEDIMENT[b]	2.0×10^3	1.3×10^5	--	--	2.5×10^5	1.1×10^6	1.3×10^3	1.3×10^6
CONTROL WATER	1.1×10^3	7.0×10^3	--	--	1.1×10^4	1.4×10^5	3.5×10^4	1.1×10^6
CONTROL SEDIMENT[b]	2.0×10^3	2.5×10^5	--	--	7.0×10^3	1.4×10^5	4.0×10^2	4.0×10^4

[a] Shaken sediment flasks contained 503 mg/ℓ (dry weight) sediment.

[b] Quiescent sediment bottles contained 5029 mg/ℓ (dry weight) sediment.

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